Mining Sulphur Offshore — *Lloyd Hawthorne*

The Humble Way

MARCH-APRIL, 1960
Combined with
MAY-JUNE, 1960

The Humble Way

March-April, 1960
combined with
May-June, 1960

Vol. XV No. 6

A Look at The New Humble Company

FIVE months ago, the shareholders of Standard Oil Company (New Jersey) and the old Humble Oil & Refining Company gave their approval to one of the most far-reaching and significant reorganization plans in the history of either company. The plan provided for the merging of several of Jersey Standard's domestic affiliates into a single new company, thus consolidating all of the parent company's producing, refining, marketing, and marine operations in the United States under one unified management. The new company, a wholly owned subsidiary of Jersey Standard, was incorporated under the laws of the State of Delaware and was given an old and familiar name: Humble Oil & Refining Company.

This new Humble Company began to function on December 1 with a small headquarters organization located in Houston and one operating Division consisting of all activities formerly carried on by the old Humble Company. Two more Divisions were added on January 1, when The Carter Oil Company and Esso Standard Oil Company merged with the new organization. Later this year, three additional Jersey affiliates—Oklahoma Oil Co., Chicago; Pate Oil Co., Milwaukee; and Globe Fuel Products Co., Chicago—will be merged into the Humble Company according to plan.

What is the purpose behind this extensive consolidation program? What advantages can be expected to result from converting six operating affiliates into one? Management spokesmen have pointed out that one of the major reasons for the merger is to gain an opportunity for greater participation in the U.S. petroleum market. It is anticipated that the over-all sales volume can be increased appreciably in the years ahead by combining the facilities formerly operated separately by the various affiliates into a single marketing organization with a company-wide trademark or symbol. The new company will be able to make use of national advertising and promotion, to enter new marketing areas where none of the separate affiliates has operated heretofore, and to expand the network of marketing facilities in some areas where present representation is comparatively light.

Oil-finding and producing operations also can be expected to become more efficient as a result of the consolidation. Before the merger, Humble and Carter carried on these functions separately and entirely independent of each other. By combining these activities into a single operating organization, considerable duplication can be eliminated and operating efficiency can be improved.

Humble's New Home Office Building Now Under Construction

The 44-story office building shown in the architect's rendering on the facing page is the future home of the central headquarters of Humble Oil & Refining Company. It will occupy an entire block in downtown Houston, three blocks from the old Humble Building. A parking garage will occupy another entire block diagonally adjacent to the main building.

Ground was broken for the new building on February 16, and subsurface construction work is now well underway. Bids will be received on June 1 for construction of the office building, the garage, and the tunnel connecting the two. Work on these phases of the project is expected to begin early this summer, and is scheduled for completion about two years later.

The office building will contain approximately one million square feet of usable floor space. It will measure about 115 feet by 250 feet, and will tower 600 feet above a block-square base which will consist of a semi-underground concourse level and two lower basements. An unusual exterior feature of the building will be the fixed horizontal sunshades of aluminum and porcelain. A modular system of partitioning the floor space inside the building will provide maximum flexibility and will make it possible to re-arrange office spaces with a minimum of expense.

Other significant advantages are inherent in the merger. For example, the problems of crude oil supplies, scheduling of transportation, and scheduling refinery runs can now be coordinated on a unified basis.

In addition to the anticipated reduction of costs and improvements of operating efficiency, the new company has still another advantage. As a nation-wide operating company it is in better position to take advantage of business opportunities than any of the separate units would have been before the merger.

How will the employees of the various units be affected by the consolidation of operations into a single company? M. J. Rathbone, president of Standard Oil Company (New Jersey) made this reassuring comment at a Jersey employees meeting:

"We think that the personnel is in good shape in the various components. When you put them all together and put an expansion program into the picture too, we're not going to need any less people. We're going to need more."

Further reassurance along these lines was given by Humble President Morgan J. Davis in a recent talk before an employee group in the Carter Division.

"This new company will offer many new opportunities for employees," he said. "Because decentralization will be emphasized, more authority will be delegated to lower operating levels, and employees generally will have the chance to assume greater responsibilities in field operations. Any changes in work assignments growing out of the merger will be made with a minimum of inconvenience to employees. Transfers brought on by the merger will probably be comparatively few in number, and these will largely be voluntary opportunities which employees will want to consider."

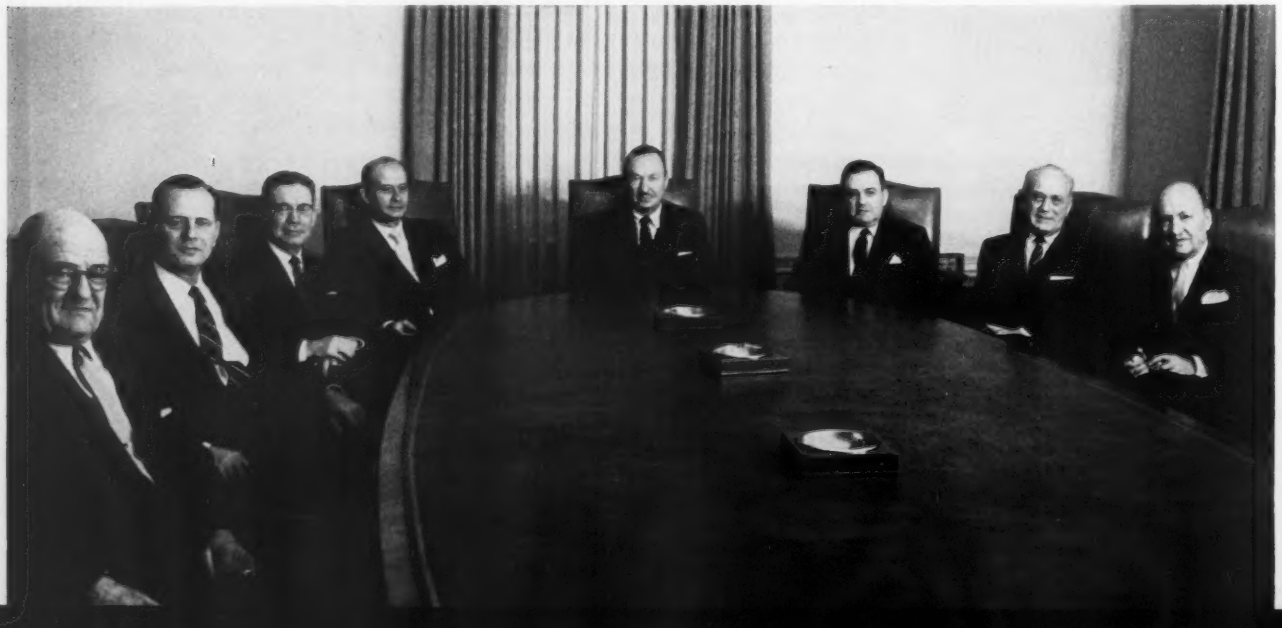
The ultimate organization structure through which the new Humble Company will seek to accomplish its aims is still being planned. President Davis, in his talk to Carter Division employees, had this to say on the subject:

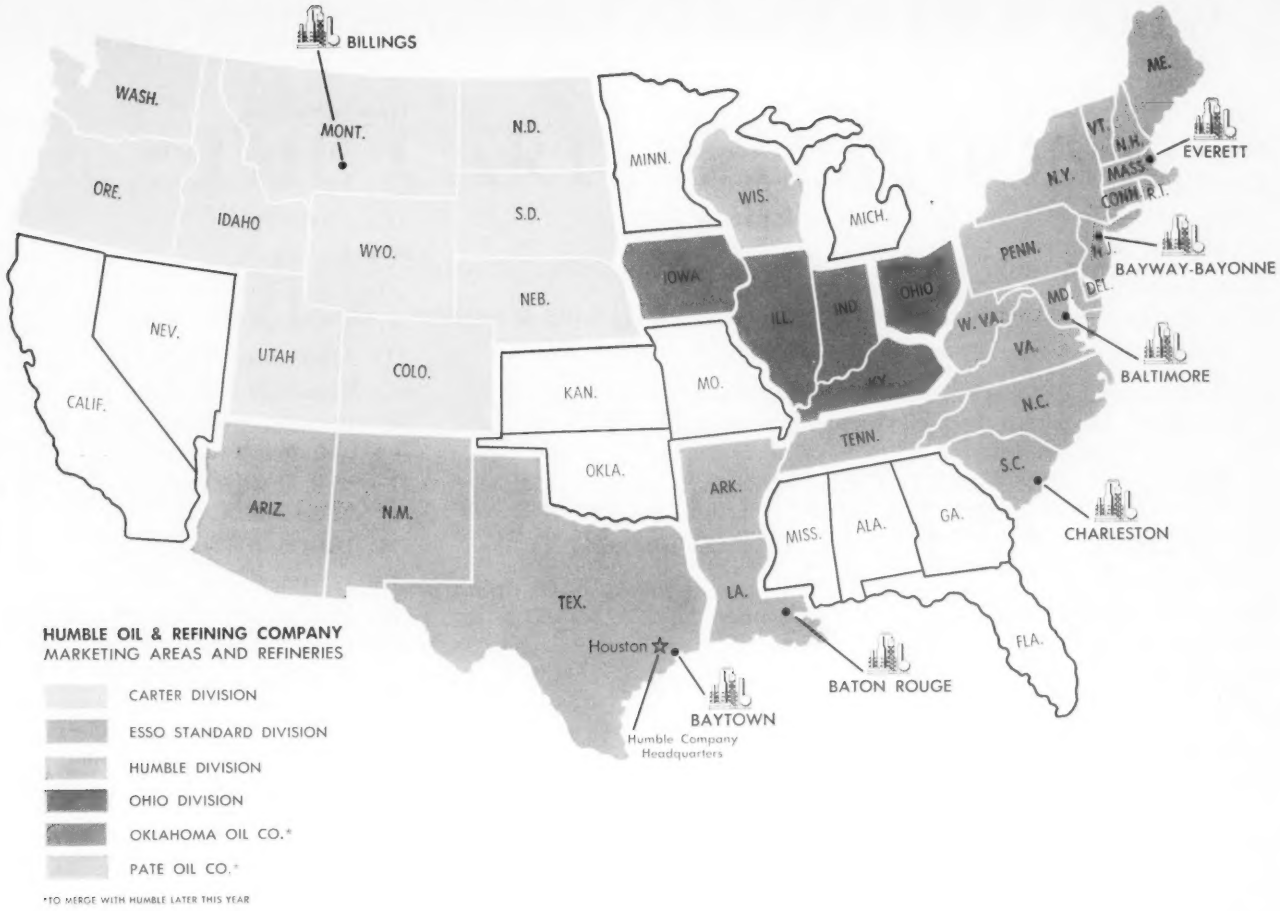
"For some time, of course, our new company will continue to operate on a divisional basis. Your management, however, is giving careful thought and study to determining if there is a different type of organization structure into which we should eventually evolve. Whether we shall adopt a functional regional type of organization or an integrated regional one, or a combination of the two, I cannot say at this time. I believe that it will, basically, be a decentralized type of organization, however. In any event, we do not intend to start making changes unless they are carefully considered from the employee viewpoint and, then, only after committees on which the Divisions and departments are represented have recommended the procedures."

Meantime, considerable progress is being made in consolidating and coordinating the various activities of the new Humble Company. By way of review, the following steps have been accomplished in the few months since the over-all merger program was approved by the shareholders:

- An eight-man Board of Directors assumed its duties on December 1 and has been meeting regularly. Members of this Board include the president, three executive vice presidents, and four vice presidents.
- Boards of Management have been established for each of the three operating Divisions, and are directing the activities of their respective Divisions. These Boards of Management are responsible to the Company's Board of Directors.
- A vice president for public affairs and a vice president for marketing have been elected. These officers are not members of the Board of Directors.
- A number of other officers, department managers, and various key staff assistants have been named to the headquarters organization (see page 4). Coming from the several Divisions, these men have moved to the Company's headquarters in Houston, where they occupy office space, along with other Company executives, on the five upper floors of the Humble Building.
- The Humble Company is qualified to do business in every state in the Union, including the new states of Alaska and Hawaii.
- A new Ohio Division has been created for the purpose of setting up a

Members of Humble's Board of Directors are, from left: H. W. Haight, vice president; E. Duer Reeves, vice president; John W. Brice, executive vice president; C. E. Reistle, Jr., executive vice president; Morgan J. Davis, president; D. W. Ramsey, Jr., vice president; H. W. Ferguson, vice president; and William Naden, executive vice president. Effective June 1, Mr. Brice will resign as executive vice president and become president of the Carter Division in Tulsa, but will continue as a director on Humble's Board.





marketing organization in that heavily populated state. Headquarters for this new marketing division are located in Columbus. Initially, two sales districts will be in operation, with headquarters in Cleveland and Zanesville. James T. Outz, formerly special assistant to the general manager of marketing of the Esso Standard Division, has been named head of the Humble Company's new Ohio Division.

• Announcement has been made that, effective May 31, the subsidiary Enjay Company, Inc., will be merged into the Humble Company as Enjay Chemical Company, a Division of Humble. This Division will be responsible for all marketing of chemical products, coordination of supplies of chemical products, coordination of chemical research programs, and for recommending the location and nature of new chemical investments throughout the United States. It will sell chemicals to Esso Export Corporation for distribution in foreign markets. Chemical marketing operations of the Humble Division and Esso Standard Division are being consolidated into the new nation-wide chemical marketing organization. J. E. Wood, III, formerly president of Enjay Company, Inc., will continue as president of Enjay Chemical Company.

Thus the new Humble Oil & Refining Company is moving as rapidly as possible toward unification of its widespread and varied operations. It will be many months, perhaps years, before the ultimate organization structure will have been completed. Meantime, the Company is going ahead with its studies toward further expansion, especially in marketing.

Following the planned mergers of the Oklahoma, Pate, and Globe companies later this year, Humble Oil & Refining will be the largest domestic oil company in the United States. It will have:

• Some 42,000 employees carrying on the work of finding, producing, transporting, manufacturing, and marketing oil and oil products.

• The largest domestic reserves of oil and natural gas of any company in the United States.

• Approximately 17,850 active oil and gas wells.

• Net production of liquid hydrocarbons of about 466,000 barrels a day.

• Pipe line facilities capable of transporting about 700,000 barrels a day of crude oil and oil products.

• Tanker transportation facilities capable of moving some 350,000 barrels a day between Gulf Coast and New York-New Jersey ports.

• Refining capacity at nine manufacturing plants in excess of 950,000 barrels a day.

• More than 28,500 retail outlets serving the motoring public in 37 states.

But magnitude, in itself, is not an objective. Humble's management sees in the Company's expanded role an opportunity to provide better service and products for its customers, better job opportunities for its employees, and better returns on their money for the hundreds of thousands of people who have financial interests in Humble through their ownership of stock in the parent company, Standard Oil Company (New Jersey).

WHO'S WHO in Humble's Headquarters Organization

	Position	Former Position
Morgan J. Davis	Director & President	(H)[1] President & Director
C. E. Reistle, Jr.	Director & Exec. V.P.	(H) Exec. V.P. & Director
William Naden	Director & Exec. V.P.	(E) President
John W. Brice[2]	Director & Exec. V.P.	(C) President
H. W. Ferguson	Director & V.P.	(H) V.P. & Director
H. W. Haight	Director & V.P.	(C) Chairman of the Board
D. W. Ramsey, Jr.	Director & V.P.	(J) Marketing Coordinator
E. D. Reeves	Director & V.P.	(E) Exec. V.P. & Director
J. L. Seger[3]	V.P. for Public Affairs	(C) President & Member Board of Management
W. W. Bryan	V.P. for Marketing	(C) V. P. & Member Board of Management
R. J. Gonzalez	Coordinator, Finance & Economics	(H) Director & Treasurer
L. R. Moore	Treasurer	(E) Treasurer
C. S. Overmiller	Asst. Treasurer	(H) Manager, Economics Department
Nelson Jones	General Counsel	(H) Director & General Counsel
F. M. Darrough	Associate General Counsel	(C) V.P., Gen. Counsel, & Director
H. L. Stone, Jr.	Attorney	(H) Attorney
R. H. Bidwell	Attorney	(E) Attorney
J. H. Foster, Jr.	Attorney	(C) Attorney
O. L. Luper	Controller	(H) Controller
W. C. Jennings	Asst. Controller	(E) Exec. Asst. Controller
Lamar Jones	Asst. Controller	(E) Asst. Controller
A. O. Hinkle	General Auditor	(H) General Auditor
W. G. Clark	Staff Asst. to Asst. Controller	(J) Head, Refining Accounting Coordination Division
L. J. Weigle	Secretary	(C) Manager, Southern Division
Paul V. Lucas	Coordinator, Executive Compensation	(H) Div. Head (Salary & Wage)
A. R. Martin, Jr.	Assistant Secretary	(E) Assistant Secretary
D. F. Edwards	Employee Relations Mgr.	(E) Manager, Bayonne Refinery
J. N. Gorringe	Asst. Employee Relations Manager	(E) Manager, Employee Relations Dept.
T. M. Welch	Div. Head, Plans Division, Employee Relations Dept.	(E) Head, Plan Development & Social Security Division
G. B. Edwards	Manager, Tax Department	(C) Controller
W. J. Crawford	Asst. Manager, Tax Dept.	(H) Asst. Controller
A. E. Collier	Asst. Manager, Tax Dept.	(H) Lawyer
W. D. Seyfried	Research Manager	(H) Manager, Research & Development
D. M. Cox	Manager, Supply & Distribution	(E) Gen. Manager, Supply Dept.
W. B. Morgan	Executive Assistant	(H) Lawyer
Dr. H. D. Wilde	University Relations Counselor	(H) Research Coordinator

[1] Key to initial letters: (H)—Humble; (E)—Esso Standard; (C)—Carter; (J)—Standard Oil Company (New Jersey).

[2] Mr. Brice will return to Carter Division as President, effective June 1, 1960, but will continue as a Director of the Humble Company.

[3] To become effective June 1, 1960.

Meet the Family . . .

THE CARTER DIVISION

Brings Mid-Continent crude oil supplies and Rocky Mountain and Pacific Northwest marketing facilities to new Company

THE story of the Carter Division goes back to 1877, when Colonel John J. Carter, a prosperous merchant in the historic oil town of Titusville, Pennsylvania, decided to sell his clothing store and seek a new career in the lusty young oil industry.

Colonel Carter—the military title followed him into civilian life after his distinguished service in the Union Army during the Civil War—launched his new business venture at Sistersville, West Virginia, where he invested boldly and heavily in oil properties. His acute business judgment stood him in good stead, and the Colonel's investments proved profitable. By 1893, these holdings had become so extensive that he organized a corporation—The Carter Oil Company—to operate them.

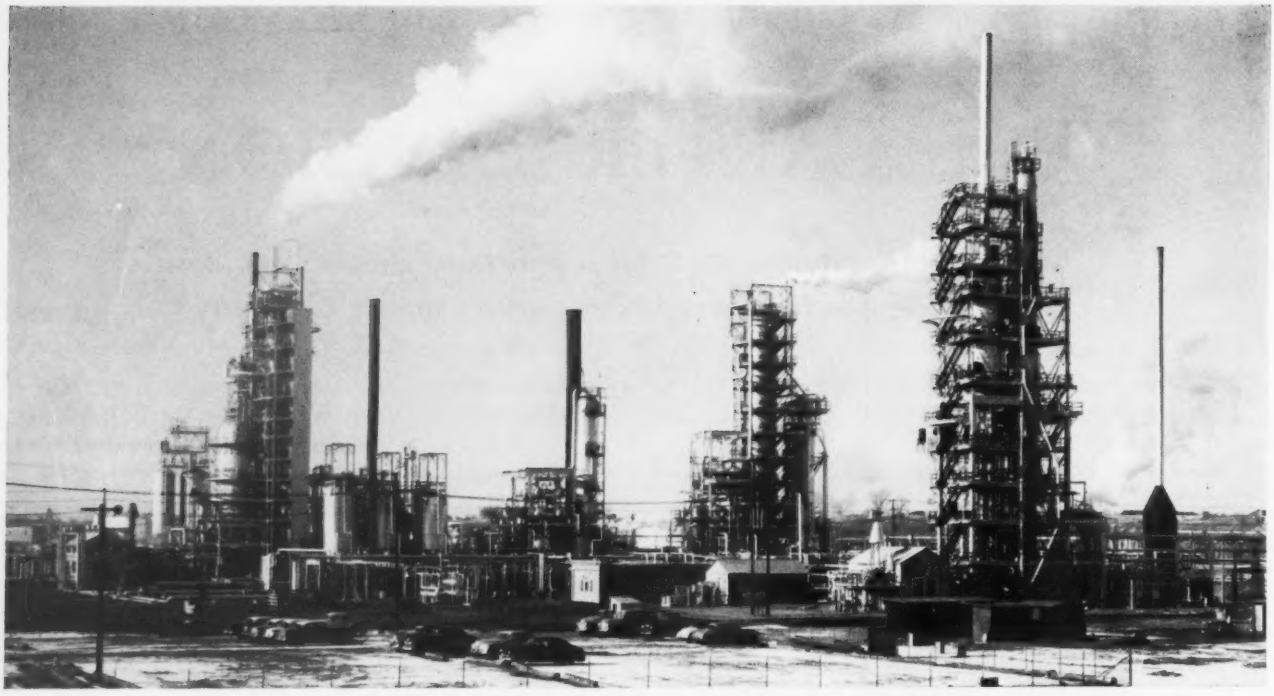
By the following year, Colonel Carter had sold a 60 per cent interest in his young and growing company to the South Penn Oil Company, then the principal producing company of the Standard Oil interests. Subsequently, the remaining 40 per cent was acquired. With the Colonel still at the helm, The Carter Oil Company soon became a recognized leader in the development of oil and gas wells in West Virginia and Eastern Ohio. By 1905, the company had a total of 1,800 producing wells in the two states.

As the automobile began to win acceptance as a practical means of transportation, during the first decade of the new century, market demands for gasoline climbed steadily higher. To help supply those demands, Carter built a natural gasoline plant at Sistersville. Completed in 1910, this was the first of 30 such plants built by the company in West Virginia and Ohio to extract gasoline from natural gas.

In 1911, when the Standard Oil interests were split into separate units as a result of a U. S. Supreme Court ruling, Carter was the only producing company left to Standard Oil Company (New Jersey).

Early in 1915, Carter established a new Western Division, with head-

Members of the Carter Division's Board of Management when this picture was made in February were, from left to right: C. G. Herrington, executive vice president; M. W. Haas, vice president; W. W. Bryan, vice president; R. P. Ryan, general counsel; Joseph L. Seger, president; and Thos. Brownfield, vice president. On April 15, Mr. Bryan resigned to become vice president for marketing in the Humble Company. Effective June 1, Mr. Seger will resign to become vice president for public affairs in the Humble Company.



Billings Refinery, operated by the Carter Division in Montana, is a modern plant with a crude run capacity of 34,000 barrels daily. Among other recent improvements was addition of a 2,300-barrel alkylation unit to provide blending stock for premium gasoline.

quarters in Tulsa, Oklahoma, and began to take an active part in the Mid-Continent area of oil operations. Colonel Carter retired from active management of the company that year, and A. F. Corwin became president. Two years later, Colonel Carter died.

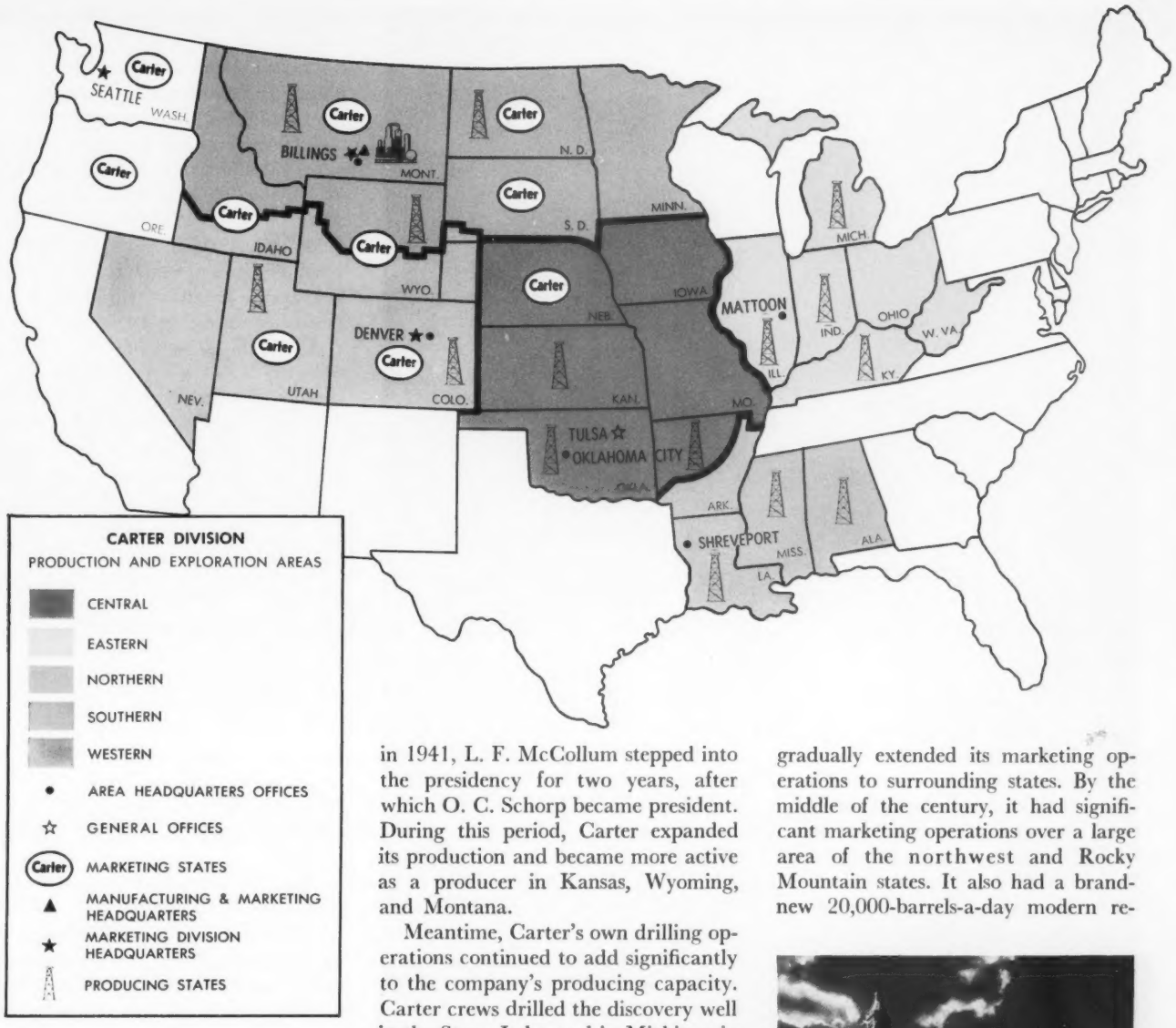
Starting in Oklahoma with production acquired in the Cushing-Drumright pool, Carter rapidly increased its holdings by buying additional production and undeveloped oil properties in several of the state's active areas, and in the Eldorado Field in Kansas. The company now launched an extensive exploration and wildcat drilling program—a program which still is being pursued vigorously. In 1917, Carter opened the Maverick Springs pool in Wyoming and widened the search for new reserves in Colorado, Kansas, and New Mexico.

Development foreman checks the flow of oil into a tank in the Albion Field in southern Michigan. Carter was active participant last year in development of Scipio-Albion Trend.

Early in 1919, only a few months after the end of World War I, Carter moved its central headquarters from West Virginia to Tulsa, concentrating its efforts thereafter on developing its properties in the Mid-Continent and northwest areas. In 1925 and 1926, the company disposed of all of its holdings in Ohio and West Virginia.

Guided by R. M. Young, who became president in 1926, and C. H. Lieb, who succeeded him in 1932, the Carter Company continued to grow in scope and stature. During this period it developed or acquired producing properties in southern Oklahoma, in the Oklahoma City Field, and in the Fitts Pool in Pontotoc County, Oklahoma. It also built the largest natural gasoline plant of its kind in the nation.

In 1936, Carter moved into the Illinois-Indiana-Kentucky area with modern exploration methods. The next year, a Carter drilling crew hit the discovery well in the great Loudon (Illinois) oil field. Of the nearly 2,000 wells subsequently drilled in the development of this field, 67 per cent were



drilled by Carter. Loudon soon became the company's largest producing operation, and it remains so to this day.

Under J. J. Conry, who became president in 1938, the Carter Company amended its charter to include research activities. A research center was built at Tulsa and Carter's research teams were soon making significant contributions to the technology of the oil and gas industry. Meantime, the company also extended its producing areas into Arkansas and Louisiana. By merger with Louark Producing Company (another Jersey company) in 1941, Carter acquired an additional 10,000 barrels daily of production and 300 additional employees.

Upon the retirement of J. J. Conry in 1941, L. F. McCollum stepped into the presidency for two years, after which O. C. Schorp became president. During this period, Carter expanded its production and became more active as a producer in Kansas, Wyoming, and Montana.

Meantime, Carter's own drilling operations continued to add significantly to the company's producing capacity. Carter crews drilled the discovery well in the Stony Lake pool in Michigan in 1946, and went on two years later to support the discovery well in the Pentwater pool. The company also played an important part in the discovery and development of pools in Oklahoma's Golden Trend area. Carter drilled discovery wells in the New Hope, Southwest Panther Creek, and Foster North Fields, and participated in the discovery wells at Southwest Antioch and Bradley Northeast.

In 1943, after half a century of operating as a producing company, Carter took a bold step into manufacturing and marketing. It started with the acquisition of the Santa Rita Oil and Gas Company of Cut Bank, Montana. Among other properties, Santa Rita owned a refinery and a number of retail marketing outlets.

From this small beginning, Carter gradually extended its marketing operations to surrounding states. By the middle of the century, it had significant marketing operations over a large area of the northwest and Rocky Mountain states. It also had a brand-new 20,000-barrels-a-day modern re-

Carter Division headquarters offices are in this National Bank of Tulsa building.

Seismic shot sends plume of dust into the clear air of the Uncompahgre Plateau country in Colorado as one of Carter Division's exploration crews probes deeply buried formations.

finery in operation at Billings, Montana.

John W. Brice became Carter's eighth president in August 1952, and under his leadership during the next seven years, the company continued to expand its varied and widespread operations. Hundreds of new service station outlets went into operation under the sign of the Carter oval; the company's refining facilities were increased to an average daily crude run capacity of 34,000 barrels; and product sales grew significantly. Exploration efforts brought still more important new discoveries, especially in the Four Corners area, and the company's production figures climbed to record levels.

On December 1, 1959, Carter's President John W. Brice resigned to accept a position as an executive vice president and director of the new Humble Oil & Refining Company. Joseph L. Seger became president of The Carter Oil Company, continuing as president of the Carter Division when the merger with Humble took place at year-end.

As one of the three major Jersey Standard affiliates involved in the initial mergers, Carter brought into the new Humble Oil & Refining Company an efficient and smoothly functioning organization operating in 26 states and manned by nearly 2,700 experienced employees. It also brought properties, plants, and equipment valued at more than $171 million, not counting oil and gas reserves. Carter has more than 4,100 oil and gas wells in production or capable of producing, and owns leases on some 261,000 acres of producing property. It also holds leases on 4 million acres of undeveloped acreage at various locations throughout the Division's operating territory.

Although Carter has producing wells in 16 states, a large share of the Division's total current oil production comes from six pools: Loudon Field in Illinois; Elk Basin in Montana-Wyoming; McElmo Creek Field in Utah; East Inman Field in Illinois-Indiana; Magnolia Field in Arkansas; and the Golden Trend in Oklahoma.

The administrative hub of the Carter Division's widespread activities is the Division's headquarters in Tulsa, where a five-man board of management directs the over-all activities. Production and exploration operations are organized into five geographical Areas, formerly called Divisions, with headquarters offices in Oklahoma City; Mattoon, Illinois; Billings, Montana; Shreveport, Louisiana; and Denver, Colorado.

The manufacturing and marketing headquarters are located in Billings, which is also the site of the Carter Division's only refinery. Marketing operations are further divided into three regional Divisions with headquarters in Seattle, Billings, and Denver. Nearly 1,100 service stations in 10 states now sell Carter products.

Appropriately, Carter's merger with Humble took place at a time when Carter's over-all operations stood at an all-time peak. Profits, gas discoveries, production, refinery runs, and product sales during 1959 were at the highest levels in the company's 67-year history. Preliminary figures show consolidated net earnings for the year totaled $33.6 million. Net crude oil production averaged 82,600 barrels daily, net gas sales averaged 190 million cubic feet daily, and petroleum product sales totaled 441.6 million gallons. Refinery runs at the Billings refinery averaged 31,090 barrels daily—a gain of 25 per cent over the preceding year.

In December, its last month as a separate company, Carter achieved a

This Carter Servicenter in Portland, Oregon, is typical of the attractive modern retail outlets serving motorists of the Pacific Northwest. Carter started as a producing company and did not enter the marketing field until 1943. Division now markets in 10 states.

net crude oil production rate of 85,680 barrels a day, setting a new all-time record for a single month, and surpassing the previous record set during the Seminole (Oklahoma) boom in April 1927 by 1,310 barrels daily.

Reviewing the results of the 1959 operations, Carter's President Joseph L. Seger had this message for the employees:

"The other members of the Carter Board join me in expressing our sincere appreciation to all employees for making 1959 a record year.

"This outstanding performance could not have been achieved without the loyal efforts of everyone in the organization.

"We have been proud of working together in The Carter Oil Company. We can be equally proud of the opportunity to work with the employees of the other companies being merged in making the new Humble Oil & Refining Company a successful corporation."

Night drilling scene at a Carter Division wildcat well location in the Four Corners area of Utah. Carter completed 26 net wildcat wells last year, six of them productive.

Meet the Family . . .

ESSO STANDARD DIVISION

Strong marketing organization in heavily populated area and impressive manufacturing capacity are its contribution

ESSO Standard Oil Company operated as a separate corporation for a little more than 32 years before its recent merger with the new Humble Oil & Refining Company. Its roots, however, go back many more decades—almost to the very beginnings of the oil industry. Esso's Baltimore Plant, for example, can trace its operations back to 1867, only eight years after Colonel Edwin Drake drilled his historic well at Titusville. Another Esso plant, the Bayonne (New Jersey) Refinery, first went on stream in 1877.

For 45 years before Esso Standard was born, the operations it was to inherit were carried on as integral functions of the parent Standard Oil Company (New Jersey). The change came in 1927, when Jersey Standard separated itself from operational activities and became exclusively a holding company. At the same time, all refining, marketing, and transportation operations formerly carried on by the parent company in the Eastern area of the United States were turned over to a new, wholly owned affiliate which later became Esso Standard Oil Company.

The new operating affiliate, incorporated under the laws of the State of Delaware, was first given the name Standard Oil Company of New Jersey. Because of the similarity of this name with that of the parent Standard Oil Company (New Jersey), many people avoided confusion by calling the affiliate "The Delaware Company" and the parent "The Jersey Company."

At the time of its founding, the new operating company assumed responsibility for the three existing refineries in the New York harbor area, at Bayway, Bayonne, and Jersey City; and three other refineries located in Baltimore, Maryland; Charleston, South Carolina; and Parkersburg, West Virginia. It also took over the distributing and marketing operations in an area which included New Jersey, Maryland, the District of Columbia, Virginia, West Virginia, North Carolina, and South Carolina. Another affiliate of Standard Oil Company (New Jersey), known as the Standard Oil Com-

Original Board of Management of Esso Standard Division included, left to right: F. P. Hagaman; J. P. Warner, vice president; R. H. Scholl, executive vice president; O. V. Tracy, president; B. L. Ray, vice president; R. O. Goodykoontz, vice president; and T. W. Moore, vice president. Mr. Ray will retire from the Company in June, reducing the number of Board of Management members to six.

pany of Louisiana, operated in the states of Louisiana, Arkansas and Tennessee.

The first expansion move came in 1928, when marketing activities were extended into Delaware and a new subsidiary, Standard Oil Company of Pennsylvania, was formed to handle marketing in the Keystone State. Additional outlets for the company's products were found the following year in New York and in the New England states.

In 1929, Standard Oil Company of New Jersey further expanded its scope of operations by acquiring an interest in an important grease-making plant in Pittsburgh.

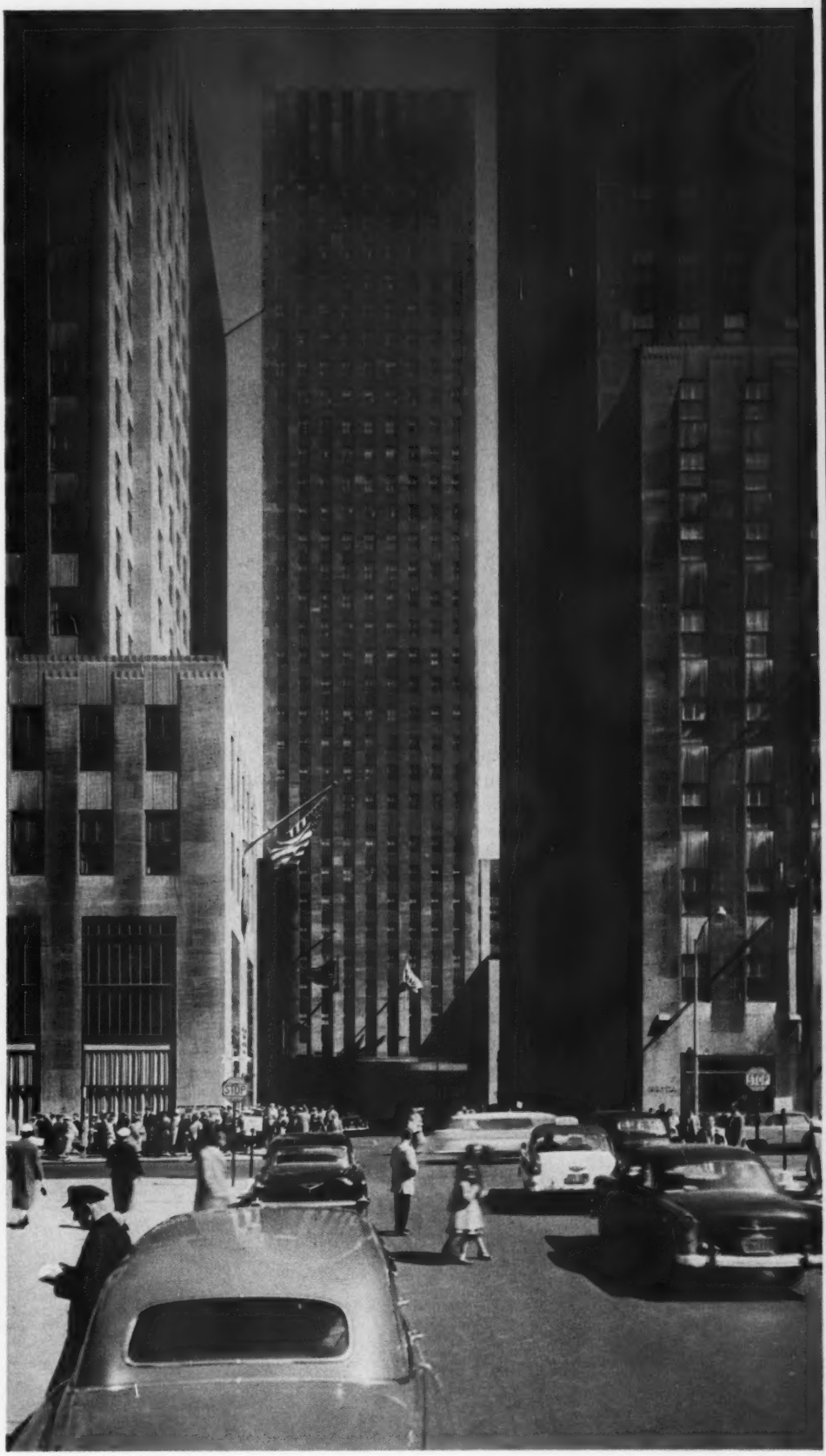
In 1932, a revamping of the management function of operating these separate corporate companies occurred. Marketing and manufacturing departments were consolidated in one headquarters office at 26 Broadway, New York City. This improved the efficiency of the domestic operation and was the first step toward further consolidation. Heavy emphasis was placed on reduction of cost and improved market position in the years immediately following.

In 1944, the affiliated Standard Oil Company of Louisiana was merged into Standard Oil Company of New Jersey.

In addition to its marketing facilities, Louisiana Standard also brought into the organization its huge refinery at Baton Rouge. This important manufacturing plant, strategically located on the bank of the Mississippi River, was added to and coordinated with the other Esso manufacturing operations. At the same time, Standard Oil Company of New Jersey transferred its deep sea tanker fleet back to the parent Company.

In 1947, the Colonial Beacon Oil Company, an operating affiliate of Standard Oil Company of New Jersey, was merged into the latter company. The effect of this was to bring into the Standard Oil Company of New Jersey a refinery at Everett, Massachusetts, near Boston, and numerous marketing outlets in New York and the New England states.

By this time, the brand name *Esso*—which had first been registered in 1923 and had been given to a new premium gasoline—had become widely known. In 1948, the name of Standard



Esso Building, headquarters for Esso Standard Division, is a familiar landmark in midtown New York City; in this view, the camera is looking north from Rockefeller Plaza.

Esso service stations such as this are a familiar sight to motorists in the 18 states and District of Columbia where the Esso Standard Division carries on marketing operations. Esso products are sold by some 24,000 independent service station dealers from New England to Louisiana.

Oil Company of New Jersey was changed to Esso Standard Oil Company. During the same year, the Company completed moving its headquarters uptown, from the old 26 Broadway location in New York to the new Esso Building, located at the north end of Rockefeller Plaza at 15 West 51st Street.

Several internal mergers were effected during the 1950s in moves designed to further increase operating efficiency. The subsidiary, Standard Oil Company of Pennsylvania, was merged into Esso Standard at the beginning of the decade. In 1958, Esso Shipping Company merged with Esso Standard and became the Marine Department of the latter. Last June, Kesbec, Inc., an affiliated company that marketed automotive products in the New York metropolitan area, was merged with Esso Standard.

On January 1 of this year, Esso Standard merged with and became an operating Division of the newly formed Humble Oil & Refining Company. It brought into the new company the largest marketing and manufacturing operations of any of the Divisions, and the largest group of employees—almost 21,000. With seven refineries and manufacturing plants, a fleet of tankers and barges, and extensive marketing facilities covering 18 states and the District of Columbia, Esso Standard's gross

Baton Rouge Refinery, with crude run capacity of 365,000 barrels daily, is largest refinery in the nation. Mississippi River, visible in background, is waterway for barge transportation to inland points, and for sea-going tankers serving Atlantic Seaboard.

investment totals more than one billion dollars.

Three subsidiary companies owned by Esso Standard also were brought into the new Humble organization as a result of the merger. These are: (1) Tuscarora Oil Company Ltd., which operates a products pipeline in Pennsylvania; (2) Penola Oil Company, which markets a variety of lubricants and special products; and (3) Enjay Company, Inc., which markets petrochemical products (See page 3).

As a Division of Humble Oil & Refining Company, Esso Standard still maintains its headquarters in the towering Esso Building in New York City. Here, a six-man board of management directs the various activities of the Division. Here, too, are the headquarters for the various staff departments and the five operating departments.

Esso Standard's Marketing Department operations are organized into nine geographical Sales Areas with headquarters offices located in Boston, Massachusetts; Pelham, New York; Elizabeth, New Jersey; Philadelphia, Pennsylvania; Baltimore, Maryland; Richmond, Virginia; Charlotte, North Carolina; Memphis, Tennessee; and New Orleans, Louisiana. Each of these marketing divisions is further divided into a number of districts.

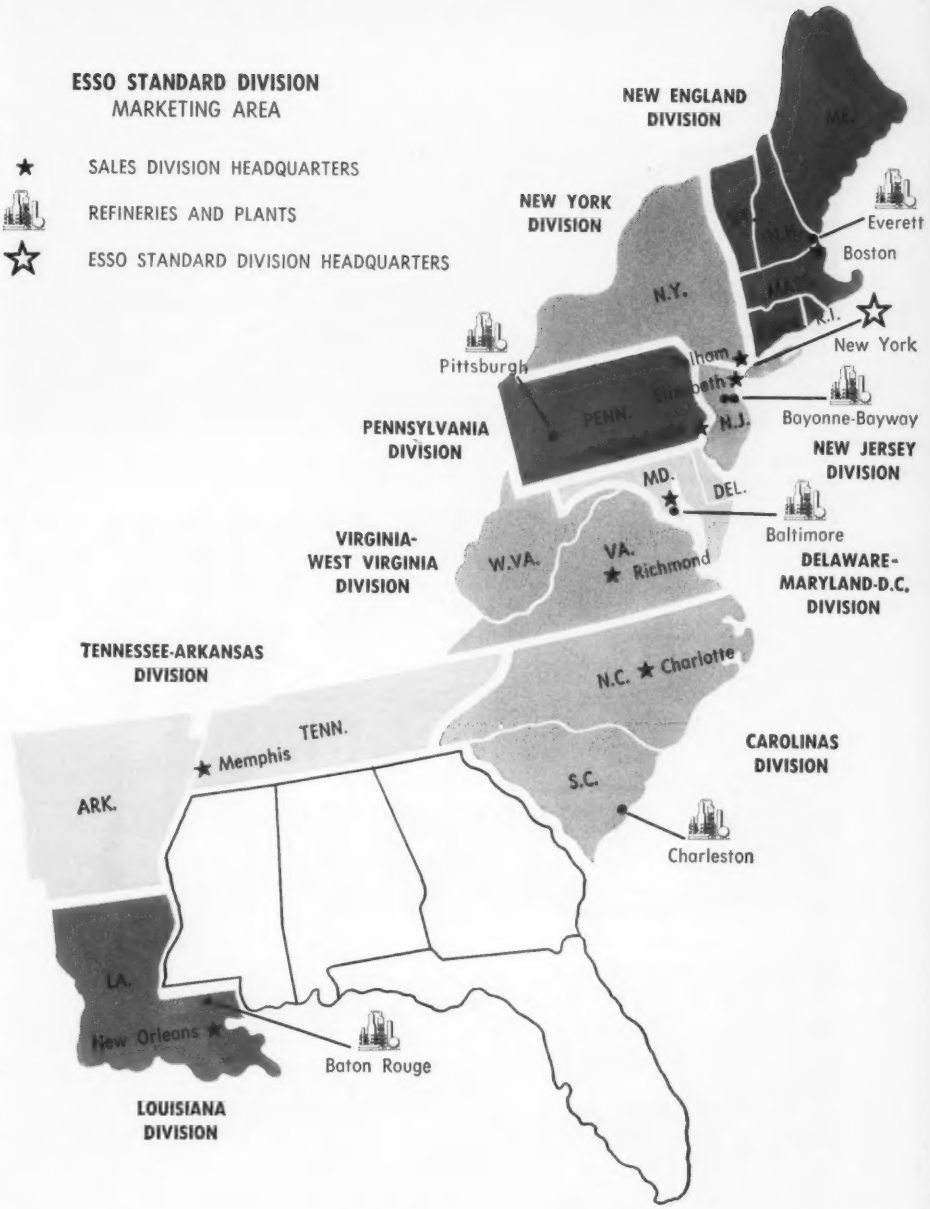
Esso's total dollar volume of sales in 1959 was about two billion dollars. This amounted to approximately 370 million barrels of petroleum products, or more than one million barrels a day.

Certain types of product sales, particularly those to customers having widespread operations, are handled out of the New York headquarters office.

The Manufacturing Department is responsible for planning and coordinating the operations of Esso Standard's seven refineries and plants. Manufacturing plants and refineries operated by the Esso Standard Division include:

• Baton Rouge Refinery, in Louisiana. This refinery—which makes a full range of petroleum products, including Butyl rubber, alcohol, and other petrochemicals—is the largest refinery in the U. S. It has a daily crude run capacity of 365,000 barrels.

• Bayway Refinery, in New Jersey, the second largest of Esso Standard's plants. It is principally a fuel products refinery; however, its chemical products division produces alcohols, paratone, and other petrochemicals.



• Bayonne Plant, in New Jersey, formerly a fuel products refinery, but now a specialties plant and lube oil terminal. This plant has facilities for manufacturing asphalt and some lube oil additives; for the refining of wax; and the compounding, blending, and packaging of lube oils.

• Baltimore Plant, also a lube oil terminal and specialties plant, making asphalts and greases. This plant was a fuel products refinery until 1957.

• Everett Refinery, in Massachusetts. This plant contains units for distillation, catalytic cracking, treating, and asphalt manufacture.

• Charleston Plant, in South Carolina; a small plant with distillation, blending, and treating facilities, used principally for production of asphalt.

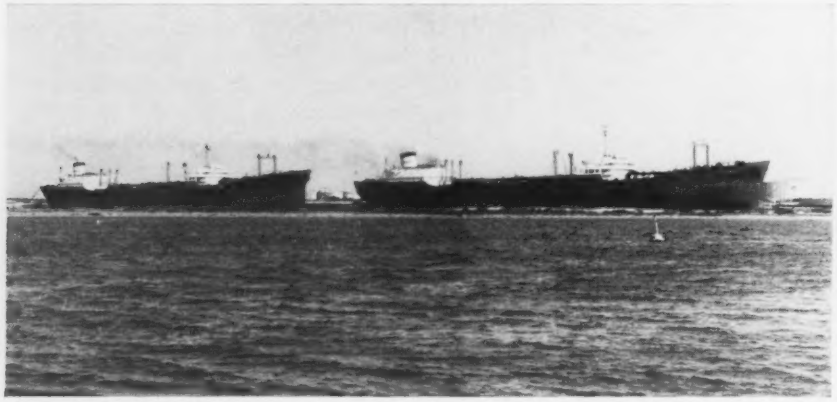
• Pittsburgh Plant, which is one of the world's largest grease-making plants.

In the daily operations of these manufacturing plants and the network of marketing facilities in its 18-state area, the Esso Standard Division must transport huge amounts of crude oil and oil products. Water transportation plays an important part in this phase of operations.

To take care of these movements by water, Esso Standard's Marine Depart-

Pushing barges laden with gasoline from Baton Rouge Refinery, tow boat *Esso Louisiana* moves up Mississippi River. Inland waterways are vital to Esso's transportation operations.

Esso distributor delivers heating oil to snow-blanketed home of a customer in an eastern state. In addition to customers served by distributors, Esso sells to some 137,000 homes.



These tankers, *Esso Gettysburg* and *Esso Lexington,* are part of 26-ship fleet operations of Esso Standard Division hauling oil and oil products between Gulf and Atlantic ports.

ment maintains a fleet of 26 sea-going tankers under the American flag. These tankers, plying between Gulf Coast and Eastern Seaboard ports, have a total carrying capacity of 350,000 barrels a day, based on the New York-Gulf Coast run.

In addition to the sea-going ships, the Marine Department also operates a fleet of some 62 vessels engaged in transporting oil and products through hundreds of miles of inland waterways. The principal areas served by these inland waterways barge operations are those of the New York, Albany, New Haven, and Boston harbors; Baltimore and Norfolk; and along the Mississippi and Ohio Rivers between New Orleans/Baton Rouge and Pittsburgh.

Working closely with the Marine and Manufacturing Departments is the Supply Department of Esso Standard Division. Although the actual purchase of crude oil is handled by the Manufacturing Department, the Supply Department is responsible for planning these purchases and scheduling the transportation of the raw material to refineries.

Esso Standard Division has still another operating department, the Chemical Products Department, which is responsible for coordinating the manufacture and sale of chemical products. It is also responsible for co-operation with development and research groups on projects necessary to protect and advance the chemical business. Chemical products manufactured by this department are sold by the affiliate, Enjay Company, Inc.

A summary of the Esso Standard Division's over-all operations shows that it markets some 800 different products at a current average rate of about 370 million barrels a year. These products are sold to a variety of customers including some 24,000 independent service station dealers, 25,000 industrial and other commercial accounts, 4,000 resellers and distributors, and 137,000 homes.

As a Division of Humble Oil & Refining Company, Esso Standard continues to maintain its traditions of good service, good citizenship, and good relations with employees and the public. With pride in their past contributions to the nation's progress, Esso Standard employees can now look forward to new opportunities for growth and accomplishment.

Meet the Family . . .

THE HUMBLE DIVISION

Substantial crude oil and natural gas reserves give Division role of major raw materials supplier in new Humble Company

THE U. S. was on the verge of war when the original Humble Oil & Refining Company was founded. What is now the Humble Division was organized in Houston by a group of independent producers on March 1, 1917, little more than a month before this country entered World War I against Germany on April 6.

But the excitement of war was not the only turbulence which greeted the new company. Uncertainty and confusion were rife in the Texas oil industry. Independent producers could not find dependable outlets for their crude oil, nor a stable price.

It was out of these uncertainties that Humble Oil & Refining Company was born. The founders were a group of successful independent oil producers. They had learned from years of experience, however, that finding oil was much simpler than finding a regular market for it. These independents —one of whom was W. S. Farish, later to become president of Jersey—agreed to pool their production in the hope of insuring a steady supply of oil for potential markets and thereby also obtaining a better and more stable price.

The company derived its name from a major oil field which had been discovered in 1904 near the small town of Humble, Texas, about 20 miles north of Houston. In this field several of the organizers had production; one had a small refinery. Others had flowing wells in a number of the prolific Gulf Coast oil fields of Texas.

A unique feature of the early days of the company was this: between organization on March 1 and receipt of corporate charter on June 21, the new company operated under nothing more than verbal agreements, based on the pledges of some 25 independent oil men. Only friendship, unity of purpose, and faith—faith and integrity of everyone concerned—held together for almost four months a merger which involved some $8 million in properties and a daily crude oil production of more than 7,000 barrels.

This unusual arrangement became a bench mark for the old Humble's corporate way of life. For more than three decades of the company's remarkable growth, men who were a party to that agreement guided its destinies.

From its very beginning, Humble operated as an integrated company. It had most of the facilities required for an integrated business, but these facilities were far from being impressive in size. Its one and only refinery, for example, was a small installation of the *tea kettle* variety at Humble, Texas. This plant processed only 300 barrels a day, all of which came from a single freak well. The marketing division owned one lone Model T truck, which picked up each day's output at the refinery and hauled it to Houston for sale to *filling stations*. There was also a small pipe line—a three-mile gathering system in the Goose Creek field, not far from the present site of Baytown Refinery.

But mainly, Humble was a prolific producer of crude oil. Those were the days of open-flow wells, and in less than a year's time the young company had almost doubled its original daily

Members of the Humble Division's Board of Management are, left to right: Carl Illig, general counsel; James H. Galloway; Ralph J. Schilthuis, executive vice president; Ray H. Horton, president; H. P. Pressler, vice president; Ed. J. Hamner; and Russell H. Venn.

Exploration activities in Alaska are under direction of Houston Office

production of 7,000 barrels. By the end of 1918 it ranked third among Texas oil producers. Thus, at the beginning, was created an emphasis on oil production which was eventually to make the old Humble America's leading producer of oil, a title it held until about two years ago when severe production cutbacks in Texas and Louisiana took their toll.

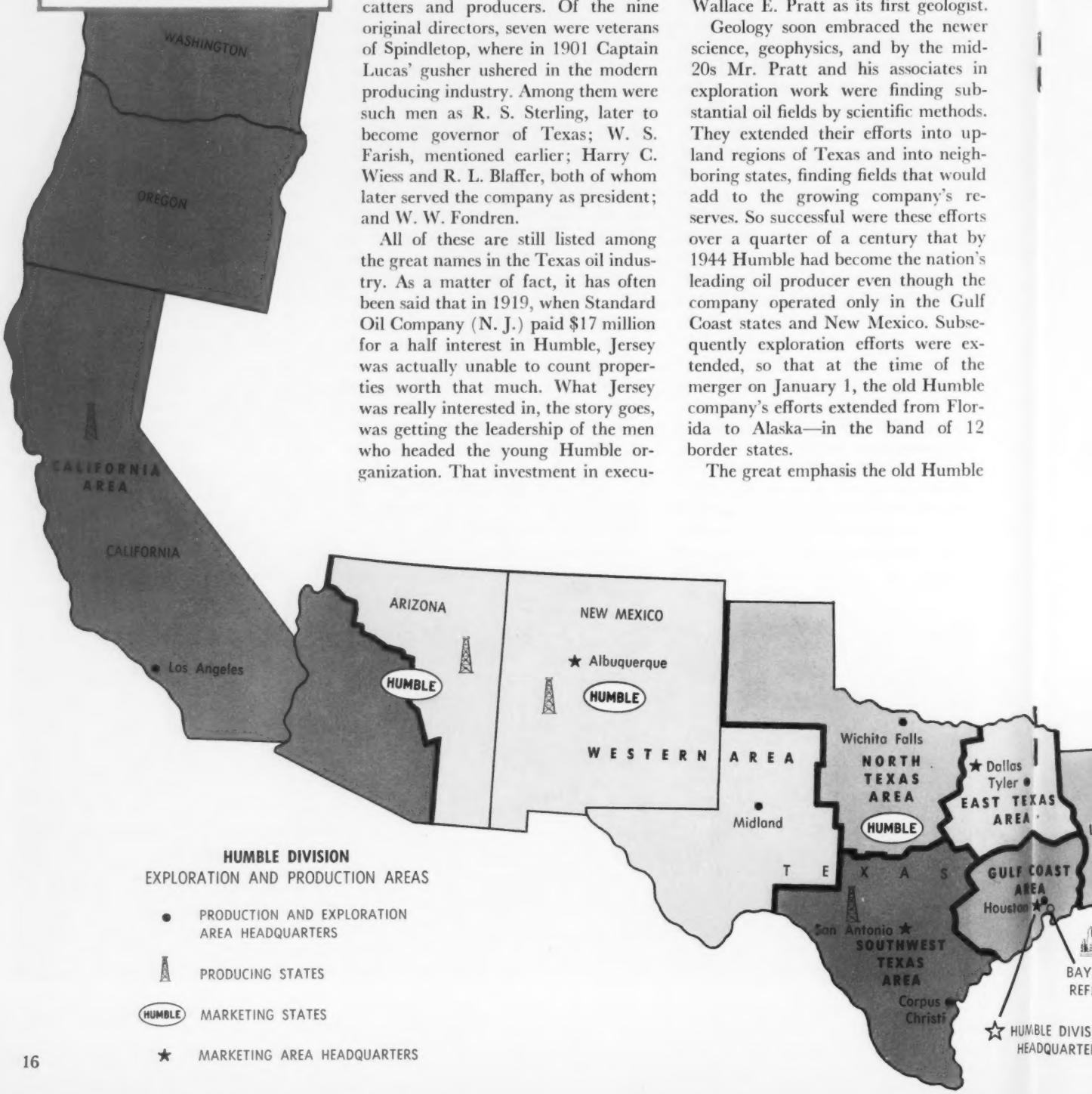
The old Humble's emphasis on production was only natural since the founders were first and foremost wildcatters and producers. Of the nine original directors, seven were veterans of Spindletop, where in 1901 Captain Lucas' gusher ushered in the modern producing industry. Among them were such men as R. S. Sterling, later to become governor of Texas; W. S. Farish, mentioned earlier; Harry C. Wiess and R. L. Blaffer, both of whom later served the company as president; and W. W. Fondren.

All of these are still listed among the great names in the Texas oil industry. As a matter of fact, it has often been said that in 1919, when Standard Oil Company (N. J.) paid $17 million for a half interest in Humble, Jersey was actually unable to count properties worth that much. What Jersey was really interested in, the story goes, was getting the leadership of the men who headed the young Humble organization. That investment in executive talent, if such it was, paid off.

Although the founders of Humble were oil finders and producers, like others in the business at that time, they had been depending for their discoveries on surface evidence—oil and gas seeps, waxy paraffin dirt, or mounds and hills in the flat coastal region of Texas. Geology was only beginning to be applied to the search for oil when the old Humble company was organized. However, it was only a year later that Humble engaged Wallace E. Pratt as its first geologist.

Geology soon embraced the newer science, geophysics, and by the mid-20s Mr. Pratt and his associates in exploration work were finding substantial oil fields by scientific methods. They extended their efforts into upland regions of Texas and into neighboring states, finding fields that would add to the growing company's reserves. So successful were these efforts over a quarter of a century that by 1944 Humble had become the nation's leading oil producer even though the company operated only in the Gulf Coast states and New Mexico. Subsequently exploration efforts were extended, so that at the time of the merger on January 1, the old Humble company's efforts extended from Florida to Alaska—in the band of 12 border states.

The great emphasis the old Humble



placed on oil production is illustrated by the fact that between 1917 and 1960 the company drilled some 26,000 wells. About 5,000 of these were dry holes. Of the 21,000 successful oil and gas wells completed over the life of the company, 13,826 were producing at the time of the merger. Net crude oil and gas liquids produced over the 43-year period total 2,871,000,000 barrels, and yet the Humble Division today ranks among the leaders in the nation in proved oil and gas reserves.

From the earliest days the founders recognized the need for a pipe line system to bring the young company's production to market. Starting with the three-mile gathering system in the Goose Creek oil field, near Houston, Humble Pipe Line Company was organized in 1919, as a wholly owned subsidiary of the old Humble company. In the following year an eight-inch line was built from Ranger in north central Texas to the coast. Thereafter, expansion was rapid as lines fingered out to serve newly discovered fields in all parts of Texas. Within a decade after the pipe line subsidiary was organized it had built a system of more than 5,000 miles of gathering and trunk lines.

Over the past 20 years the system has been expanded to reach new producing areas, so that on January 1 of this year its 9,300-mile system in Texas was serving more than 27,000 wells in approximately 700 Texas oil fields. The real significance of this transportation system to the Texas oil industry comes alive in these figures: total crude oil carried to tidewater and to refineries and products carried to market in little more than 40 years approximates 6 billion barrels—more than a two-year supply for the entire nation at today's high consumption rate.

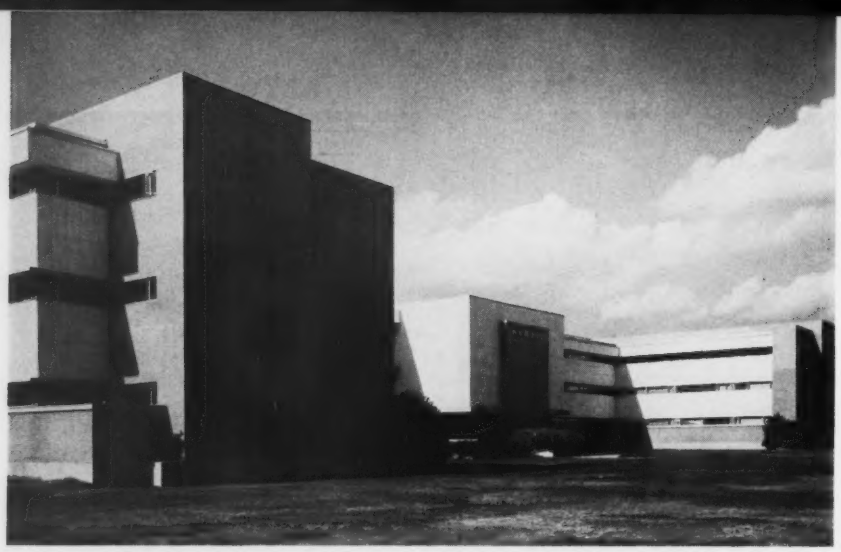
Humble Building, which occupies a full block in downtown Houston, will house headquarters offices of Humble Company and Humble Division until completion of new building in 1962.

Although the old Humble company started life with nothing more than a 300-barrel-a-day *tea kettle* refinery in 1917, it was only two years later that its management decided to go into refining in a more significant way. On 2,200 acres of low lying, boggy rice land, near Baytown on the Houston Ship Channel, work was started late in 1919 on what was planned as a 10,000-barrel-a-day lubricating oil refinery. First crude oil was charged to stills on May 11, 1920. Shortly thereafter an expansion program was begun and has been continued over the years, bringing the refinery to its present capacity of 293,000 barrels a day.

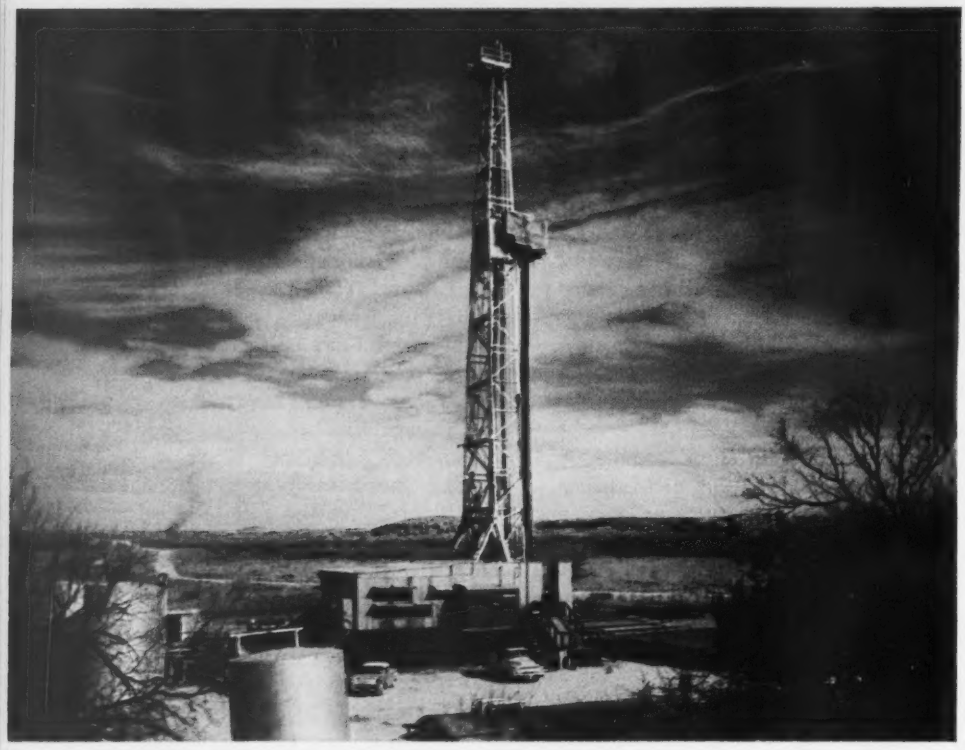
Baytown Refinery gained considerable recognition during World War II for its contribution to the nation's war effort—for its large volume production of toluene for explosives, synthetic rubber, and aviation fuels and lubricants. On December 14, 1944, Baytown employees and Humble management joined with government and military leaders to celebrate the manufacture of the one-billionth gallon of 100 octane aviation gasoline—the first plant in the nation to reach that high mark.

Since World War II, Baytown has been enlarged appreciably, with greatest emphasis on facilities for manufacturing petrochemicals. Leading raw products manufactured are synthetic rubbers, basic materials for clothing, and a broad group of synthetics for plastics.

Because the end results of any integrated oil company's efforts must be



Exploration, drilling, and production research for the Humble Division is carried on at Houston Research Center. In the shops, craftsmen build or assemble specialized equipment.



This West Texas ranch country well is one of 26,000 Humble has drilled since organization in 1917. Almost 14,000 of that number were producing oil or gas at the time of the merger.

Attractive Humble service stations, long prominent in Texas for quality products, service, and cleanliness, began serving motorists in New Mexico in 1955 and in Arizona in 1959.

related unfailingly to its marketing ability, the old Humble had been active as a marketer throughout its lifetime. However, since much of its crude oil production and a large portion of its refined products were sold in tanker lots to affiliates, the company's retail marketing efforts were confined entirely to the state of Texas until recent years.

Beginning with a modest "four retail outlets" in 1917, the old Humble company quickly acquired more distribution by the purchase of Lone Star Oil Company in 1918 and the Bonner Oil Company in 1919. With the wholesale and retail outlets thus acquired the young company enjoyed a steady increase in volume during the middle 20s. It was in the late 20s and early 30s that it began a building and expansion program of its own and thus raised its sales to about seven per cent of the state's market.

This figure held rather steadily during the 30s and the war years. It was only after World War II that the old Humble company's management decided to go aggressively after the Texas market. Product quality leadership became possible by quick conversion of Baytown refinery from war to civilian production. An aggressive sales organization was developed and a crash building program was set in motion to increase outlets. This combination brought Humble from fifth place among gasoline marketers in the state in 1945 to first place in 1951—a position which it has not relinquished since that time. At the time of the merger early this year the old Humble company enjoyed about 16½ per cent of the Texas gasoline market.

In 1955 Humble expanded marketing into far western Texas and New Mexico, and in 1959 the red, white and blue oval moved farther westward into Arizona. At the time of the merger about 3,150 outlets were selling Humble products in the three-state area.

During the development of the various integrated activities, the old Humble company depended heavily on research for its growth and progress. Product research was the earliest set up, but shortly thereafter came scientific study of oil reservoir behavior and research for better oil finding and drilling tools. At the end of 1959, some 640 employees were engaged in research, with exploration, drilling, and

With a daily capacity of 293,000 barrels, Baytown Refinery ranks as the nation's second largest. From it flow products for farm, home, and industry, plus a variety of petrochemicals such as synthetic rubber and raw materials for the manufacture of clothing and plastics.

production research concentrated at the Houston Research Center and refining and product research at the Baytown Research laboratory.

At the time of the merger on January 1, the present Humble Division brought the following into the newly organized Humble Oil & Refining Company:

Unoperated leases totalling 13½ million acres in 12 states;

Exploration work in progress in Florida, Georgia, Alabama, Mississippi, Louisiana, Texas, New Mexico, Arizona, California, Oregon, Washington, and Alaska;

13,826 producing oil and gas wells;

An average daily net production of 354,000 barrels of crude oil and liquid hydrocarbons;

A wholly owned subsidiary, Humble Pipe Line Company, with a network of 9,300 miles of gathering and trunk lines carrying 600,000 barrels a day of crude oil and products;

Baytown Refinery on the Houston Ship Channel, with a daily capacity of 292,300 barrels of crude oil for the manufacture of oil products and petrochemicals;

3,150 retail outlets in Texas, New Mexico, and Arizona to serve the motoring public.

And a final statistic: By the time of the recent merger the shareholders' investment in the old Humble Oil & Refining Company had increased from the original $8 million in 1917 to more than $1½ billion.

King Ranch Gas Plant will be world's largest cycling operation; will process 800 million cubic feet daily when completed by summer's end.

Humble products line delivers 20,000 barrels of light products daily to six sales terminals between Baytown and Dallas-Ft. Worth area.

Future Members of the Family . . .

OKLAHOMA OIL CO.
PATE OIL CO.
GLOBE FUEL PRODUCTS CO.

Now affiliates of Jersey Standard, these marketing organizations will give Humble representation in important mid-western states

IN the heavily populated upper middle west, where consumption of petroleum products is very substantial, Humble Oil & Refining Company later this year will gain a firm marketing foothold. Here, three marketing organizations, now owned by Standard Oil Company (N.J.), will join Humble to complete the merger of Jersey's domestic affiliates announced in September, 1959.

The three are Oklahoma Oil Co., with headquarters in Chicago and marketing outlets in Illinois, Indiana, Iowa, and Kentucky; the Pate Oil Co., with distribution centered in Milwaukee and the surrounding area; and Globe Fuel Products Co., wholesale heating oil and fuel marketing organization in Chicago.

Of the three the Pate Oil Co. is the oldest, having been established in Milwaukee in 1933. Over the past 27 years this retail marketing company has grown steadily and has established a firm reputation with Wisconsin motorists for quality products and service. Motorists in Milwaukee and within a radius of 100 miles of the city have come to know the full significance of the "Hello Neighbor" greeting which adorns the Pate sign in front of about 200 service stations.

Sixty eight per cent of all cars registered in Wisconsin are operated in the area where Pate markets.

In addition to a substantial retail business, Pate Oil Co. also has developed a growing home heating oil business and markets a well-known line of specialized industrial lubricants. Pate has gained acceptance in Wisconsin's center of population as an aggressive advertiser and merchandiser; as a friendly, community-minded sales organization.

An appreciably larger organization is Oklahoma Oil Co., established in Chicago in 1936 as a retail gasoline and fuel oil marketer. Starting with an office and warehouse and 18 retail outlets, the company gained acceptance and expanded to 76 retail stations over a period of 20 years.

Through about 400 attractive stations like this, Oklahoma serves the motoring public in Indiana, Illinois, and portions of Iowa and Kentucky. An aggressive advertising and promotion program supports the service station business and a growing heating and fuel oil trade.

In 1956, the sales organizations of the Oklahoma Oil Co. and Perfect Power Corporation of Chicago, an affiliated company, were combined under the Oklahoma name. This combined organization operated a growing business through 122 attractive retail outlets. During the next two years, more retail stations were added, its fuel oil business was expanded, and an aggressive advertising campaign was carried on.

In 1958, the Oklahoma Company extended its marketing operations into 155 towns and cities in Indiana, Illinois, Iowa, and Kentucky. Included also were several bulk plants in key locations to serve some 263 retail outlets and a large number of heating oil customers.

This brought the total number of service stations now marketing under the Oklahoma oval brand to approximately 400.

Globe Fuel Products Co. of Chicago is a wholesale marketing organization which operates one of the largest heating oil and fuel oil terminals in Chicago. Terminal facilities consist of 518,000 barrels of bulk storage capacity, a waterfront loading dock 2,000 feet long, two office buildings, a garage, a 21-place loading rack for trucks, and blending facilities and steam plant. All of this is located near the heart of Chicago on the Sanitary Ship Canal.

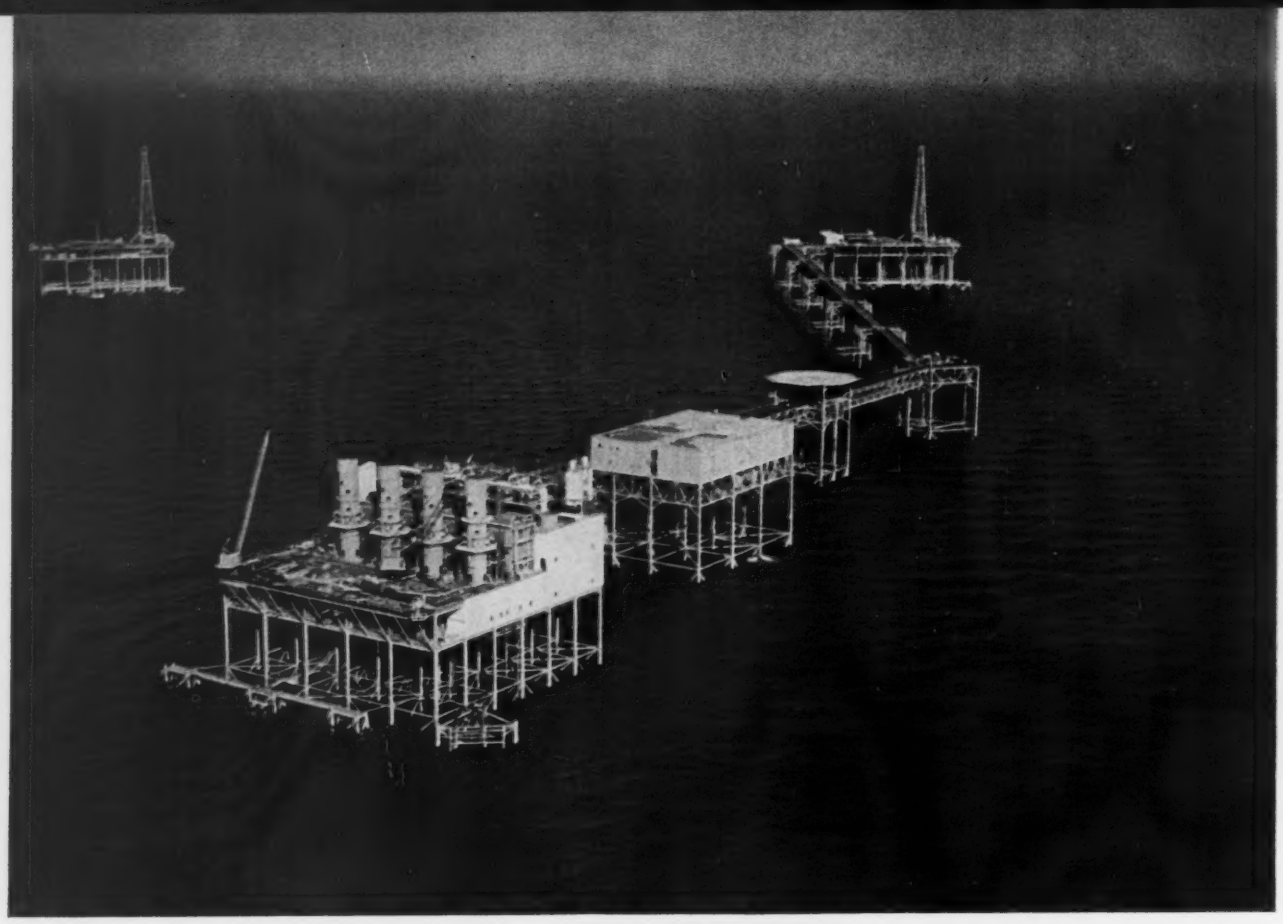
In addition to the barge terminal, Globe operates a bulk plant at Skokie, Illinois, on the northern outskirts of Chicago. Facilities there include an office, loading racks, and 12,000 barrels of storage capacity.

Globe's principal customers are retail fuel oil distributors and a large number of industrial plants in the Chicago area. The company's annual sales volume is in excess of 5,000,000 barrels.

Some 1,800 employees man the offices, terminals, bulk plants, truck fleets and 600 service stations which the three companies will bring into the new Humble Oil & Refining Company. This group joins with the employees in the newly organized Ohio Division to form the mid-western nucleus for an expanding Humble marketing organization with plans, in the years ahead, to make "Happy Motoring" a nation-wide greeting to American motorists.

At this large terminal of Globe Fuel Products Co., on the Sanitary Ship Canal near the heart of Chicago, 5,000,000 barrels of fuel products are received, stored, and sold annually.

About 200 Pate retail outlets serve motorists in Milwaukee and in communities within a 100-mile radius. Pate also markets specialized industrial lubricants and home heating oil.



Grand Isle Mine of Freeport Sulphur Co. stands in 50 feet of water seven miles off Louisiana coast; Humble found mineral deposit in 1949.

Brimstone producers are a determined breed. They find a way even when there's . . .

Sulphur beneath the Sea

Forked lightning reveals offshore platform under assault of wind, waves, and rain during height of midnight Gulf storm.

Molten sulphur from mine, sprayed on giant blocks, cools into familiar yellow "stone."

EARLY this spring, a man in a sulphur-colored hard hat tripped a switch that sent millions of gallons of scalding water surging into the crust of the earth. A few days later, in mid-April, the earth began to spew up a stream of amber-hued, acrid-smelling liquid. It was sulphur.

This procedure is routine enough in the brimstone business, but this particular sulphur mine is located seven miles from the Louisiana shore in the salty and sometimes squall-swept seas of the Gulf of Mexico. It's difficult to believe that Freeport Sulphur Company—or anybody, for that matter—would put an installation out *here* on purpose. But there it is just the same—a sprawling structure standing stilt-legged in 50 feet of water. When the jagged lightning rips the curtain of night, it resembles a skinny, grotesque sea monster. In the bright light of day, it looks like an industrial plant that took a wrong turn and waded aimlessly into the Gulf.

This is Freeport's $30 million Grand Isle sulphur mine. It's the biggest steel island ever built and the home of the world's first offshore sulphur extraction operation. When completed, the structure will be a giant "Y" with almost a mile of deck. With one of its prongs yet to be constructed, it is already as long as three big luxury liners moored end-to-end, dwarfing the nearby offshore oil platforms. One end of the 10,000-ton colossus is dominated by a three-deck power and heating plant the size of a small refinery. At the other sits the production platform from which directional wells penetrate the sulphur formation below. In between is a two-story dormitory for employees and an elevated heliport.

The sulphur-bearing limestone beneath this titanic installation rests like a skull cap atop a large salt dome. The ore body, estimated to be the third largest in the United States, underlies about 250 acres (a mere pinpoint in the vastness of the Gulf of Mexico) at depths ranging from 1,800 to 2,500

Waste water well, which siphons off hot water used to extract sulphur from formation below, is seen on separate platform in this view from beneath floor of the drilling platform.

Hearty appetites of sea-going sulphur men are appeased in stainless steel dining hall where offshore chefs prepare tasty, varied menu. Recreation and TV rooms for crews are upstairs.

feet. The sulphur productive acreage itself is small, but the sulphur deposit is unusually thick, varying from 220 to 425 feet. Sulphur content of the limestone is 15 per cent at the leanest to 30 per cent at the richest.

Exploratory drilling by the Humble Company discovered this deposit and two smaller ones in the same general area in 1949. Humble activity is still evidenced by a ring of oil and gas wells surrounding the sulphur plant on the flanks of the Block 18 salt dome. In 1956, Humble signed a profit-sharing agreement with Freeport, the oldest producer of sulphur in the country. Offshore erection of the mining plant (which included, by the way, the largest lift ever made on land or sea—650 tons) began in June of 1958. Preliminary sulphur production commenced on April 14 of this year.

Why set up a business at this storm-threatened offshore site which only three years ago was belted by *Audrey,* with her tidal waves and hurricane gusts up to 110 miles an hour?

The answer is simple. Sulphur producers, like oilmen, must go where their elusive quarry is found in commercial quantities. Most of the great inland salt domes, the major source of sulphur, have been explored. Only a very few of the numerous salt domes in the entire Gulf Coastal area contain commercial quantities of sulphur. The geological reason why a few do is unknown. Frasch sulphur men are now looking seaward for the flow of yellowish mineral that helps keep the wheels of industry and progress turning.

Like water, petroleum, and iron, sulphur is one of the essential materials to our modern civilization. So much so that it's a sensitive barometer of industrial activity and a basic ingredient used in nearly every chemical process. From an ancient position of superstition and sorcery, "the stone that burns" has emerged into a jack-of-all-trades. Sulphur is used, either directly or indirectly, to make paper, paint, soap, rayon, bleaching agents, medicines, explosives, certain kinds of cement, iron and steel, tin cans, matches, vulcanized rubber, fertilizer, and insecticides. Per capita consumption in the U. S. is 75-80 pounds a year. The oil industry alone consumes thousands of tons each year, chiefly in the form of sulphuric acid.

Besides being partners in progress

over the past century, sulphur and oil are close kinsmen as well. Oil operators, in their drilling around salt domes, have made the discoveries of nearly all of the major sulphur deposits found to date. Also, it was an oil company chemist, Dr. Herman Frasch, who developed the hot water process of recovering sulphur that released great stores of this mineral from the grasp of Mother Earth and broke the monopoly of Sicilian mines. And about the time Dr. Frasch was struggling to make his process an economic success, Texas' Spindletop oil gusher blew in 30 miles away. The father of the modern sulphur industry turned at once to fuel oil to heat the large quantities of water needed to produce sulphur.

The Frasch method, like most good ideas, harnesses some of nature's basic laws. Water is super-heated under pressure to 325° Fahrenheit and injected into wells drilled into the sulphur deposit. When the temperature of the formation exceeds 240°, the sulphur melts, separates from the rock matrix in which it was contained, and is flowed from the bottom of the well to the surface by air pressure.

The sulphur-bearing zone is overlain and covered in nature by an impervious formation, forming a huge natural pressure vessel. Excess water that has transmitted its heat to the formation is removed through waste water wells drilled along the deeper flanks of the salt dome.

Dr. Frasch's process, developed in 1894, has never become obsolete. The seawater system for Frasch production, an important engineering development in itself, was perfected by Freeport Sulphur Company in 1952 following eight years of research and experimentation.

The heating plant at the Grand Isle mine, the third largest Frasch plant in the world, is a compact metallic maze of boilers, heaters, blowers, generators, and compressors, pumps, and tanks. Each day, it delivers five million gallons of super-heated water into the sulphur-bearing horizon—enough at ordinary hot water temperatures to serve every washing machine in the city of Chicago or half of all those in Texas. The system burns 13 million cubic feet of Humble-supplied natural gas a day; about half of this is provided by a gathering platform within a mile of the mine.

View of drilling platform looks past two-story employee dormitory and elevated heliport. This gangling steel island is the Gulf of Mexico address for more than 100 sulphur workers.

Sulphur wells, unlike oil wells, drain the sulphur from a limited underground area and may last a few weeks or a few months. For this reason, new wells will be drilled continually at Grand Isle. The production platform, topped by a rig that skids in four directions on tracks, has openings to drill from 36 surface locations. Adapting directional techniques common in the oil industry, Freeport's drilling team will use each location three times to scatter 108 wells over the dome (although no more than 12 wells will be "steamed" at any one time). Before the brimstone deposit is finally depleted, three more production platforms will be needed and each will be moved twice. At abandonment in, say 25-30 years, the heart of the deposit will be pierced by more than *one thousand* wells.

The story of the Grand Isle sulphur project to date on State Lease 797 in Jefferson Parish is one of difficulties encountered and overcome. For some of the solutions, Freeport drew on the offshore drilling and operating experience of Humble and other oil com-

Biggest lift on land or sea was accomplished during construction of Freeport's offshore sulphur installation when two giant cranes picked up heating plant deck section that weighed almost 650 tons. Setting two of the massive steel sections into place required seven hours.

panies, and that of their own marsh operations. For others, new concepts had to be developed. Aside from the tricky business of building a huge heating plant and drilling wells in eight fathoms of water, there were other big obstacles—and possibly more to come.

OBSTACLE: *Weather*

Freeport knew it was building an expensive and vulnerable plant squarely in Hurricane Alley; three have passed directly over the mine site since 1893. Eight other hurricanes with winds from 100 to 128 miles an hour have raged within 30 to 160 miles of the mine since 1916. Engineers spent months designing an all-steel structure to withstand screaming winds and angry seas with 45-foot wave crests. Main walkways were placed 75 feet above normal water level and 30-inch pilings were driven through foundation templates 240 feet to "refusal" in the ocean floor. Should a big blow come, constant radio contact and regular weather bulletins will warn workers in plenty of time to evacuate by helicopter. The plant itself is tailored for just such an emergency; it can be shut down in one hour and restarted in four.

OBSTACLE: *Subsidence*

A phenomenon peculiar to sulphur extraction is that once the formation is leached of sulphur, it begins to crumble or cave in, and the surface (or ocean floor) subsides. At Grand Isle, this adds further to the heavy offshore expense which prevents locating the kiloton heating plant any great distance from the production and subsidence area—the common practice at land-based mines. Thus, over the years, the original well platform will settle more than 45 feet; the dormitory five feet and the heating plant three feet.

To combat this, bridge piers are constructed so that they can be jacked up and leveled, and bridge spans are built to permit horizontal expansion between towers as the over-lying sediments gradually tilt, creep, and sink toward the center of the sulphur deposit basin.

OBSTACLE: *Moving the Sulphur*

The toughest problem of all was devising a fast, fool-proof all-weather method to move the fiery-hot sulphur from the wells to shipping points. Freeport's engineers side-stepped the high cost of erecting offshore storage tanks and loading facilities by dreaming up a unique pipeline that extends seven miles along the Gulf floor to Grand Isle. Sulphur flows through the line in a molten state maintained by a special hot-water jacket line and heavy insulation; its capacity is 4,500 tons a day.

To prevent disrupting line expansion due to extreme thermal stresses, this complex artery was pre-stretched ("sanforized," says one pipeliner who worked on it) and buried in five feet of silt. Once at the shore end, the sizzling liquid flows directly into "thermos bottle" barges that are towed 25 miles to Port Sulphur on the banks of the Mississippi River. There it is flowed into forms erected on the ground and allowed to "freeze" or solidify into huge blocks of the familiar yellow substance before distribution to consumers.

There were, and are, other problems, of course. Some of these are corrosion, how to get fresh water to the mine, and the safety, comfort, and morale of personnel in the isolated location. All these matters required study and planning. But no matter how difficult and costly, it was necessary to wrest this great natural resource from its cache beneath the sea.

Of the 155 employees required to operate the sulphur mine and transportation system, only 80 are offshore at

any one time. The men work five 12-hour days and then have five days off. While on the steel isle, they live in a modern, air-conditioned dormitory and administrative unit that includes 60 double bedrooms and 30 baths. There's a first aid room with a full-time attendant but it's been used, happily, more often for minor illness than for accidents. In the stainless steel dining hall, workers appease sea-duty appetites sharpened by hard work and salt air.

In off-duty hours, the sea-going sulphur men are usually found in one of the two television lounges or playing pool or table tennis in the recreation room. Outdoor lovers can fish, take 20-minute hikes from one end of the boardwalk to the other and back, or throw morsels to the ever-present throngs of sea gulls. Two nights a week, some of the younger men attend classes to complete their high school diplomas; subjects approved by the Louisiana state public school system are taught by capable Freeport staff members.

Offshore sulphur, the industry's single most dramatic development in the 20th century, comes at a time when the immediate market outlook for brimstone is not bright. With the present world-wide sulphur surplus, weak prices, and growing competition from new sources, the multi-million dollar investment at Grand Isle seems, on the surface, untimely. However, Freeport's officials, along with others in the industry, are confident that present sulphur supplies, while more than ample today, will be needed for long range requirements—particularly in view of America's daily increasing dependence on chemicals, of which sulphur is a base material. The sulphur market is expected to expand at a rate of about five percent a year. So the quest for new sulphur sources shows no sign or need of slackening.

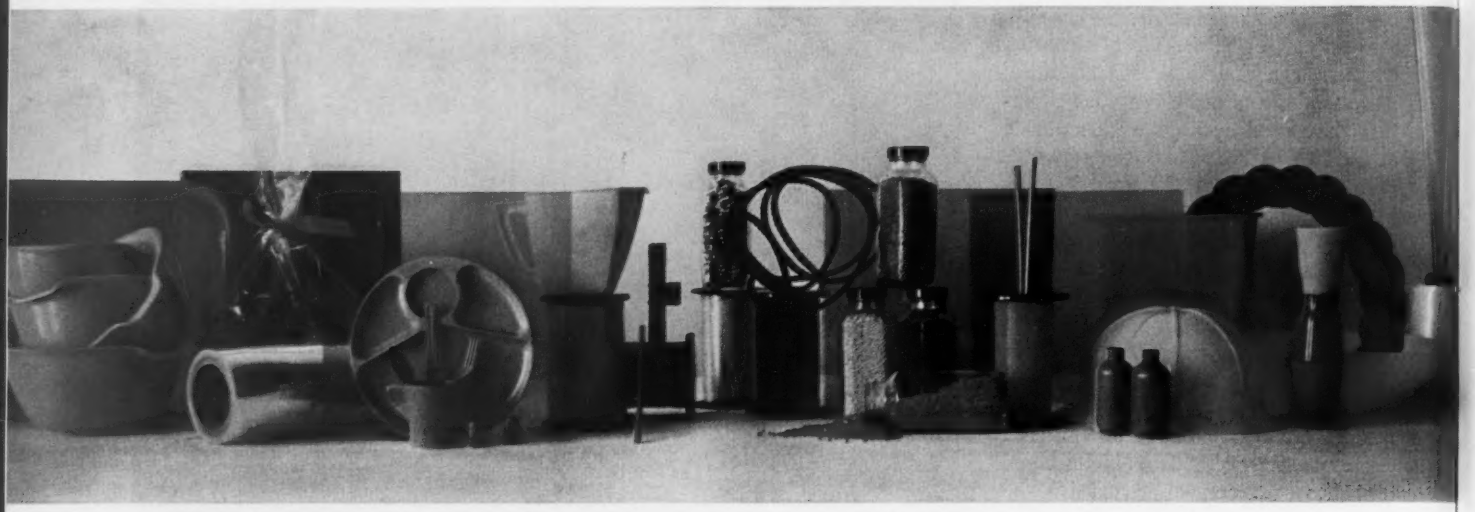
Just as the ceaseless search for petroleum promises that the U. S. will never run out of oil, the race to find and develop new sulphur reserves is assurance that the country will never want for adequate supplies of the king of chemical raw materials. Freeport and Humble's joint sulphur venture in the Gulf of Mexico represents an important milestone in meeting the growing future requirements for this important material.

Model of well system shows how 108 directional wells will be drilled from one platform and scattered, like roots of a tree, through all sections of limestone that holds sulphur deposit.

In heated concentric pipeline, molten sulphur moves from offshore mine to Grand Isle, at which point it flows aboard special, insulated barges for tow to Port Sulphur, Louisiana.

Escon Polypropylene, now rolling from Humble's Polyolefin Unit at Baytown, is one of the most promising of the . . .

New Plastics f



Colorful display of Escon polypropylene includes samples of fibers for ropes, plastic sheeting for packaging, and pellets for extruding or molding into pipes, bottles, toys, and houseware objects. New uses may push market demand to billion pounds a year in 1960s.

THE new age of plastics, sparked by the shortages of older materials during World War II, has greatly revolutionized the American scene. Plastics have moved into every field of endeavor, but unlike the thundering industrial revolution, the changes wrought by plastics have come quietly. We have hardly noticed that these synthetics have been replacing the traditional substances—such as wood, metal, paper, and glass—while finding new uses of their own as clever as plastic cocoons for mothballing ships and colored plastic coating to help direct traffic and control speeds on roadways and airport runways. Yet, the modern plastics are still young. Their future, as one industry prophet predicts, "is limited only by the imagination of man."

Against this promising background, Humble's new Polyolefin Unit recently began its manufacturing career at Baytown Refinery in Texas. Initially, it is producing *polypropylene,* the brightest new flower of the plastics family which is being marketed under the trade name *Escon*. But the plant—which incidentally was built by Humble employees—was named "polyolefin" for a good reason: ultimately it may turn out any number of other tough and versatile petroleum-based plastics which you might call petroplastics.

The largest installation of its type in the world, the Polyolefin Unit occupies an area equal to three city blocks near the site where Baytown Refinery's only other solid petrochemical—Butyl rubber—is produced. The new unit's complex arrangement of stacks and reactors stands out against the blue Gulf Coast sky in an attractive garb of pastel colors. Beneath them is an orderly labyrinth of pipes, valves, and assorted mechanical paraphernalia that defies description.

It is easier to sum up what this enormous and complex petrochemical plant does than to explain how: it takes propylene, a relatively inexpensive refinery product, and converts it into clear, miniature pellets of plastic.

The new unit is significant for a number of reasons. First, its dedication marks the completion of a major research effort by Esso Research and Engineering Company, in cooperation with Esso Standard and Humble (now Divisions of Humble Oil & Refining Company). Furthermore, it represents a substantial investment in the field of petrochemicals; more than 30 million dollars were spent on the venture before the first pound of polypropylene was produced. Finally, it heralds Humble's entry into a new industry—plastics.

Polypropylene is one of a new breed of plastics called polyolefins, discovered a few years ago when research chemists unlocked nature's hitherto exclusive secret of building giant molecules (polymers, they are called) to precise and systematic design. Polypropylene molecules, for example, resemble long, uniform corkscrews, nestled snugly against each other.* The first polyolefin plastic out of the test tube and into production was polyethylene, the widely used film and squeeze-bottle synthetic. Then came polypropylene, a chemical cousin to polyethylene. It combines a number of desirable properties in the most versatile plastic developed to date. It falls in the general category of a thermoplastic—that is, it melts under heat and pressure, solidifies when cooled, and becomes plastic again at high temperatures.

*These molecules have been called stereospecific (referring to the uniform configuration) by Prof. Guilio Natta of the Polytechnic Institute at Milan, Italy.

from Petroleum

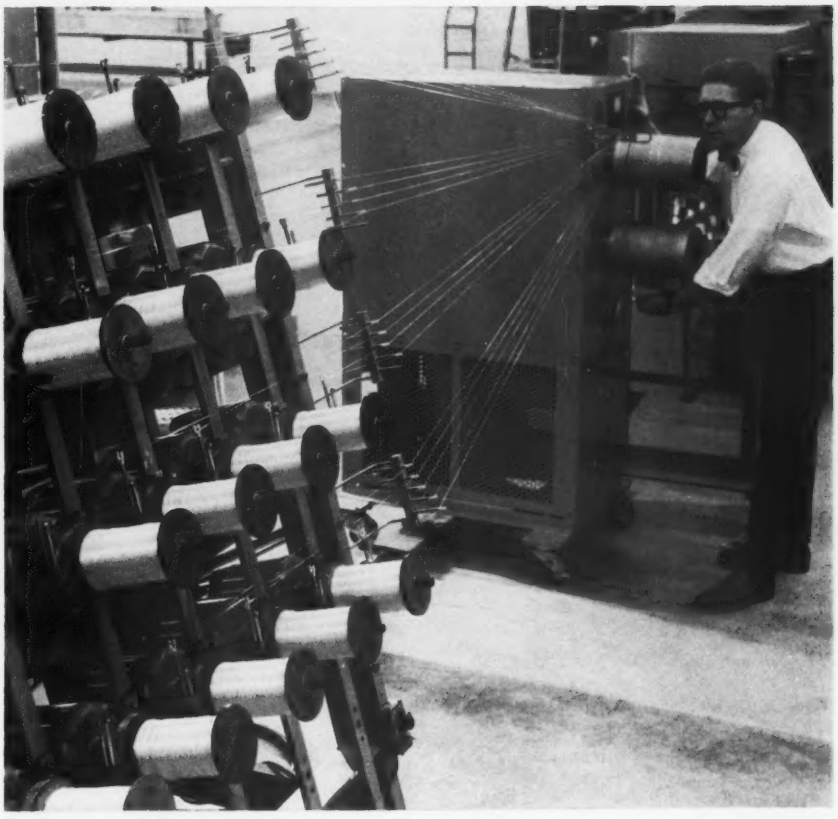
It's so light and absorbs so little water that ropes made of it will float. It is tough and strong enough for dinner-ware and machinery parts. Combs and brushes made of the plastic are so resilient that, under normal circumstances, they can be bent double without breaking. Polypropylene is highly resistant to heat, a wide variety of chemicals, oils, and greases, and is not stained by tea or coffee.

Unusual stiffness, high tensile strength and elasticity, good electrical and stress cracking properties, excellent film clarity, and phenomenal resistance to dynamic (flexing) fatigue; these, too, put polypropylene at the top of its class. What's more, it can be fabricated by all the conventional thermoplastic techniques and pigmented by standard resin coloring methods.

With all its advantages, polypropylene figures to be competitive on a cost basis with other plastics. This feature, plus its amazing adaptability, makes it a highly attractive raw material for a kaleidoscopic variety of products in home and industry. Although the new synthetic has been available in commercial quantities only two and one-half years, it is already the sensation of the forward-looking plastics industry. Estimates are that market demand could exceed a billion pounds a year by the end of the decade. Only one other plastic—polyethylene—has solidly passed the magic billion-pounds-a-year mark.

Humble's commercial interest in the polyolefin family of plastics dates back to 1954. That year, Dr. Karl Ziegler of Germany startled the scientific world by discovering a low-pressure catalyst system to produce polyethylene. Not only was his new method more economical, but the plastic itself —called linear polyethylene—seemed to be tougher and more heat-resistant than similar varieties. This chemical breakthrough stimulated further research in the polyolefin field.

Esso Research and Engineering Company bought a license on Ziegler's catalyst system soon thereafter. "The



In New Jersey, scientist winds polypropylene on spools at Esso Research Center in Linden; test program helped develop plastic with maximum tensile strength, resistance to abrasion.

In Texas, quality control chemist tests polypropylene sample fresh from new Polyolefin Unit at Humble's Baytown Refinery. Pellets of synthetic must measure up to strict specifications.

Partial view of Baytown Polyolefin Unit shows attractive color scheme of plant built by Humble employees. It has capacity of 40 million pounds of polypropylene yearly.

Ziegler license," explains one Esso research scientist, "didn't tell us how to make plastic commercially. It was more like a hunting license. Once turned loose in the Ziegler domain, we had to bag our own game and were free to develop any unique discoveries. But there was no guarantee we would find anything."

To make sure something would be found, a three-pronged research and development program was set into motion in the chemicals research division at the Esso Research Center in Linden, N. J., in the Esso Laboratories at Baton Rouge, Louisiana, and at Humble's Baytown Research Center. Using the Ziegler type catalysts, research chemists soon began, sure enough, to make remarkable discoveries of their own.

Following bench-scale work at the Esso Research Center, a 100-pound-a-day pilot plant was built at Baton Rouge. With the knowledge gained, a second pilot plant with a one-ton capacity was erected. This second unit provided much of the final process and engineering data which were used by a team of engineering experts at Esso Research and Engineering Company in the design of the Polyolefin Unit for Baytown. The pilot plant also produced polypropylene samples for market development.

Fruition of research and engineering efforts was realized this spring when Humble's Polyolefin Unit went on stream. At present, the new plant is capable of producing polypropylene at the rate of 40 million pounds a year, a figure representing a substantial portion of the total current U. S. production. The unit is designed to be expanded to 100 million pounds annually.

The new plant employs many unusual process and design features and operating techniques. Most of these, for obvious competitive reasons, cannot be revealed at this time. In keeping with the tradition of petroleum refining, the Polyolefin Unit will operate continuously 24 hours a day, seven days a week. Continuous production results in product uniformity and savings, especially in a large-scale plant.

Another interesting feature (and one highly important in the making of plastics) is the close, constant watch over product quality. Pneumatic tubes, similar to those used in department stores, regularly convey samples of *Escon* polypropylene to a nearby laboratory, where Humble research chemists torture it with as many as 37 separate physical and chemical tests.

The business of producing polypropylene involves three basic steps—polymerization, purification, and extrusion. To begin with, high purity propylene gas, liquefied under high pressure, flows into the unit's polymerization chambers. There, in the presence of the catalyst and under carefully controlled conditions of temperature and pressure, it miraculously changes from a gas-liquid to a solid. The catalyst speeds and guides the hooking together of propylene molecules into long chain-like groups. As many as 5,000 molecules may fuse to form a single polypropylene polymer.

These highly complicated units of man-made matter pass from the polymerization chambers as part of a slurry. This is filtered and dried, leaving fine crystals of polypropylene that look like white powdered sugar. The powder is then heated and forced into extruders, big machines which squeeze out the plastic like toothpaste from a tube. The many continuous strands are cooled, chopped into BB-size pellets, and directed into storage bins.

After testing to see that it meets specifications, the synthetic moves into other storage bins to await packaging

in 50-pound bags. From a warehouse in the plant, these bags of *Escon* pellets are shipped by truck and rail to marketing distribution points or direct to manufacturers who convert the thermoplastic resin into an infinite variety of finished products.

The combination of new process features and engineering design makes the Humble Polyolefin Unit extremely efficient and flexible for production of several grades of *Escon*. "The main thing to remember about polypropylene," one Humble chemist points out, "is that it's not a single material. Rather, it's a base product we modify to meet the needs of processors."

A manufacturer of outdoor furniture, for instance, might want raw material stabilized against ultra-violet light; a maker of combs might need his plastic tailor-made with easy flow and quick mold characteristics. The grades needed for these particular end uses, as well as many others, will be regularly stocked for speedy shipment and new formulations for new uses will be developed on a continuing basis.

Escon will be sold through Enjay Chemical Company, a Division of Humble Oil & Refining Company. Providing technical service for Humble's polypropylene customers are chemists and engineers at the Enjay Laboratories in New Jersey, the most modern in the petrochemical industry. Here, Enjay scientists help the customer develop new products and improve existing ones. Meanwhile, a pilot plant at Baytown Research Center assists in solving product and process problems as they arise at the Polyolefin Unit and in developing improved grades of the plastic.

Although polypropylene promises to be the most significant newcomer on the plastics scene in several years, it still faces the crucial test of competition. It must compete on the fields of quality and price against many other plastics that already have established themselves in markets where processors have invested millions of dollars in equipment. Many petrochemical experts are convinced, however, that as production problems are eliminated and new uses found, the growth of polypropylene is destined to accelerate. Already five companies—in addition to Humble—are producing the dazzling new synthetic on a commercial or semi-commercial basis. Several other companies either have plants under construction or plan to build them.

If polypropylene is able to capture its projected share of the mushrooming plastics market, it should have a bright future indeed. According to one estimate, production of plastics in the U. S. will double during the next decade to reach an annual output of about 11 billion pounds by 1970. Much of this increased demand will come as a result of new applications. Automobile industry consumption, for example, is expected to expand from its 100 million pounds in 1958 to 200 million pounds in 1965.

One important factor in the future growth of plastics is research—particularly product research. Scientists hope to discover not only better plastics but also a wider range of uses. "The whole history of our business," says one petrochemical industry executive, "is that people always come up with applications we never dreamed of."

The soaring sixties promise to be a decade of wonder products made from petroleum. And polypropylene may be the most wondrous of them all.

Hot polypropylene, resembling strings of spaghetti, flows from extruder unit. After cooling, strings are chopped into small pellets.

Packaging operation fills 50-pound bags with polypropylene pellets; bags are shipped to molders who turn plastic into useful products.

Recent Appointments

The following appointments have been announced in recent weeks by Morgan J. Davis, president of Humble Oil & Refining Company:

• Joseph L. Seger, now president of the Carter Division, will transfer to the headquarters group of the Humble Company in Houston on June 1 and will serve as vice president for public affairs (public and government relations). At the same time, John W. Brice will resign as executive vice president of the Humble Company and will become president of the Carter Division in Tulsa. Mr. Brice will continue as a director of Humble Oil & Refining Company.

• William W. Bryan, formerly vice president and member of the board of management of the Carter Division, has joined Humble's headquarters staff as vice president for marketing, effective April 15. He is responsible to Humble's board for coordination of all marketing activities of the company.

• Donald M. Cox, formerly general manager of the Supply Department in the Esso Standard Division and a director of the Plantation Pipe Line Company, has been appointed to the newly created position of manager of supply and distribution for Humble Oil & Refining Company. In his new post he is responsible for coordinating the supply and distribution activities of Humble's various divisions. He is responsible for such areas as crude oil supplies, product purchases and sales, and coordination of transportation.

• James N. Gorringe, formerly employee relations manager of the Esso Standard Division, has been appointed assistant manager of the Employee Relations Department of Humble Oil & Refining Company.

• Alan R. Martin, Jr., formerly assistant secretary of the Esso Standard Division, has been appointed assistant secretary of Humble Oil & Refining Company.

Spangler Elected

W. S. Spangler has been elected president of Humble Pipe Line Company, succeeding A. E. Pecore, who retired April 6 after more than 40 years of service. Mr. Spangler had been serving as vice president and general manager.

Two other promotions have also been announced in the Pipe Line Company. W. A. Castille, formerly acting assistant general manager, has been elected vice president—operations; and P. D. Phillips, Jr., formerly assistant general manager, has been elected vice president—planning and economics.

Supertanker Launched

The *Esso Baltimore,* Humble's newest supertanker, was launched on April 28 at the Newport News Shipbuilding and Dry Dock Company in Newport News, Virginia. Mrs. Morgan J. Davis, wife of Humble's president, performed the christening ceremony.

The giant tanker is the first of two being built at Newport News for the Esso Standard Division of Humble Oil & Refining Company. The 47,400 deadweight ton tankers are 740 feet long and have a cargo capacity of 417,840 barrels of petroleum products.

Taller than a five-story building and more than two city blocks long, the *Esso Baltimore's* cargo tanks will be able to transport enough fuel to fill the

Tanker slides down the ways.

tanks of 890,000 automobiles—17,549,000 gallons. The ship will have a speed of 17.5 knots.

The *Esso Baltimore* has a streamlined profile, including a raked smokestack. Her single 23-foot propeller is one of the largest ever installed on a vessel built in this country, weighing more than 68,000 pounds.

In spite of her size, the *Esso Baltimore's* beam of 102 feet will allow the ship to pass through the Panama Canal. Her keel was laid on September 8, 1959.

The *Esso Baltimore* is scheduled for delivery sometime in July.

The Humble Way

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Gracefully curving pipe in Baytown Polyolefin Unit forms part of pneumatic conveyor system that moves polypropylene pellets from funnel-shaped storage bins to packaging rooms.

Lloyd Hawthorne